VOL. XIX NEW YORK—THURSDAY, OCTOBER 8, 1908—CHICAGO No. 15

THE AUTOMOBILE

BRITAIN'S 4-INCH RACE WON BY NAPIER-BUILT CAR

DOUGLAS, ISLE OF MAN, Sept. 24.—The "four-inch" race, run off here to-day, was won by Watson on a Hutton car—a product of the Napier factory. Second and third places were taken by Darracqs, driven respectively by Lee Guiness and George. The three leaders all finished within five minutes.

This race was the fourth of the Tourist Trophy contests and is also, in all probability, the last road racing event to be held in the United Kingdom. Its name was derived from the fact that the cylinder bore was limited to 4 inches for a four-cylinder engine, and all the competing cars, save a touring Rover entered by its owner, have their cylinders bored out to the limit.

As might be expected, there is big variation in the lengths of stroke adopted; the smallest, 4¾ inches, being found on the Calthorpes, while the longest known stroke is the 7⅛ inches of the Darracqs. The reason for uncertainty in this last respect is that the stroke of the winning Hutton is not publicly known, but it is said to be between 7 and 8 inches. Curiously enough, the winning car was not considered to stand as good a chance as its two stable companions, which had several special features.

The winner's time was 6 hrs. 43 min. 5 sec. for the 340 miles, an average of 50¼ miles per hour. This may seem disappointingly low in view of the fact that some of the cars, and particularly the Huttons, have shown themselves capable of almost 90 miles per hour on a straight run, but it must be remembered that the Isle of Man circuit is not at all adapted for fast work and that its 38 miles includes 10 miles of climbing, 4 miles of which averages 1 in 10.

The dangers of the course for high speed work were well shown up in practice spins. Of the more serious mishaps, some five days ago the Coventry Humber ran off the road at a corner and the resulting damage was not fully repaired in time, thus preventing the realization of the excellent performance expected from this car. Similarly, much disappointment was caused by the overturning of Cupper's Metallurgique car on Monday last. The mechanic was badly hurt, but both Cupper and the car were patched up to run in the race. These Metallurgique cars, three of which were entered, are admittedly the most powerful in the race, and reliable power tests at the factory showed that the

One of the Most Picturesque Parts of the Isle of Man Course, Ballig Bridge, on the Way to Glen Helen.

Weighing-in the Arrol-Johnson, Driven by Resta.

maximum output touched 100 horsepower at 2,200 revolutions—surely an extraordinary power for so small an engine.

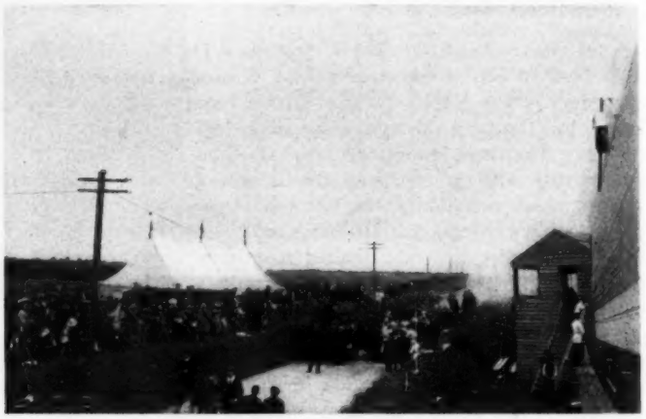
The weather to-day has been as good as could be desired, and the recent rains effectually laid all dust. Of the forty cars originally entered, the two special Rovers could not be completed in time, and the better of the two Thornycrofts was smashed up at Ramsey late last night. The two Berliets failed to materialize this morning, and hence but thirty-five cars faced the starter at Willaston at 9 o'clock. Of these cars, fifteen were foreign built and the remainder British. No American car was entered; in fact, the sole American entries in all four races were the two Whites which ran in the 1905 event.

No. 20 Metallurgique Leading Past Hillsbury.

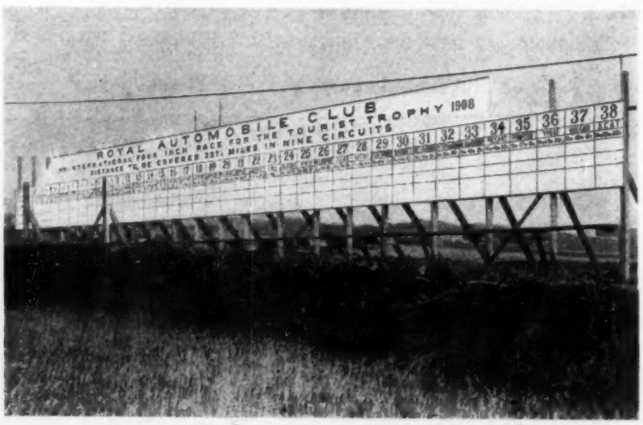
Although numbered "2," Watson's victorious Hutton was the first to be sent off, for the touring Rover, which had been allotted first place, was by kind consent of its owner relegated to the tail end of the procession—so that it might cause as little obstruction as possible. At half-minute intervals the remainder were sent off, after which the big crowd settled down to watch for the first arrival.

Victorious Hutton Not Fastest on First Round.

Forty-five minutes after the start Watson came past, followed closely by the Arrol-Johnston, driven by Roberts, and Guiness' Darracq, the order of starting being maintained. The fastest time for this lap was made by George, whose Darracq averaged just 50 miles an hour. Subsequent laps showed an all-round increase of speed and the winner's average for the whole distance showed better than the fastest performance for lap one.



General View of the Start and Finish.



Big Score Board of the Four-Inch Race.

Of the unfortunates, Stirling quickly ran his Hutton into a wall at Ballacraine, luckily without personal injury; and in similar manner the Picard Pictet tried conclusions with the Quarter bridge. Fortunately this car was, like the majority of its fellow competitors, fitted with Rudge-Whitworth detachable wire wheels, and by fitting two new wheels and repairing a front spring, it was soon on the road again.

At the end of the second and third rounds Watson still held his own, but on the fourth lap both the Arrol-Johnston and George's Darracq finally managed to pass him after so long a struggle. The other two Arrol-Johnstons had both dropped out, one through engine trouble, and the second, driven by Resta,

with a seized-up clutch. Warwick Wright's Metallurgique was also withdrawn.

The end of the fifth lap showed that Watson had dropped back again to fourth place, Tuck's Beeston Humber taking third position. Seeing how matters stood, the Liverpool man did his utmost, and at the end of the sixth circuit had won back to second place, coming between Guiness and George on the so-consistent Darracqs.

Meanwhile the list of troubles had increased. Lewis's Deasy broke its crankshaft, but a new one was refitted on the road—though surely a crankshaft is rather an unusual "spare" to carry in a race. The De Dion made rather a bad début, and a seized-up clutch caused Stocks to give up at Ramsey. Both Beeston Humbers also withdrew.

No. 7 Metallurgique Pursued by No. 15 Hutton, the Winning Car.

At the commencement of the eighth lap Watson led, with the two Darracqs not half a minute behind. These three cars continually passed and repassed until, as the final round was commenced, it was seen, with great excitement, that George was two minutes ahead of Watson, who, in turn, had two minutes' advantage over Guiness.

At 3:44 a car was signaled and quickly Watson drew up at the finishing line—not yet certain of victory. The minutes passed and Guiness' Darracq arrived, nearly five minutes behind Watson.

George was still absent when the elapsed time had run out and Watson was declared the winner. Just as the result was posted up the missing Darracq roared up, taking second place, two minutes behind the winning car. It appears that at Glen Helen George found his carbureter on fire, and six valuable minutes were lost in repairing the damage done.

Although record time was made from this point to the finish, it was impossible for the Darracq to win back so much, and so, for a fourth time, a British car has been victorious in the Tourist Trophy race.

Truly George deserves to be called unlucky, for in the race of two years ago his Argyll finished second but was disqualified through loss of ballast on road.

The fourth to finish was the Calthorpe, driven by Porter—the lowest-powered car in the race—at an average of 46 miles an hour. The only others to complete before the time limit were the second Thornycroft and the Vinot.

THE AUTO CYCLE RACE.

DOUGLAS, I. O. M., Sept. 22.—The third annual race held by the Auto Cycle Club of Great Britain for a miniature of the Tourist Trophy, was won today by Marshall on a 3 1-2-horsepower Triumph. The competitors were divided into two sections, the single-cylinder class having 15 starters, and the multicylinder class 20 starters. A 16-mile course was covered 10 times. The winner's time was 4 hours, 4 minutes and 50 seconds, an average of 38 1-2 miles per hour. The race was singularly devoid of accidents. It is interesting to note that all the competing machines except three were fitted with high-tension magneto systems.

BRITISH TRADE TIRED OF RACING.

DOUGLAS, I. O. M., Sept. 23.—Two interesting races were on the program for to-day: the contest for the Henry Edmunds trophy over a 4-mile climb up Snaefell, and the Graphic trophy straightaway race of 5 miles near Foxdale. Both of these events were open to standard touring cars of power not exceeding 40 horsepower by R. A. C. rating, but as only four entries were received for each race the R. A. C. decided to cancel them.

The opinion, both of the general public and of the representative trade bodies, is entirely against the continuance of road events, whether in the form of races or of timed hill climbs, and hence it is extremely probable that to-morrow's Tourist trophy contest will be the last of its kind to be held.

No. 12 Deasy and No. 14 S. C. A. T. Rounding Kirkmichael Corner.

Down This Homestretch Past the Paddock to the Finish the Drivers Made Their Grandstand Plays.

SIMPLEX SCORES IN BRIGHTON'S BRUTAL "24" HOUR

AFTER one of the fiercest fought struggles in the whole history of long-distance track racing, and most destructive to men and machines as well, a 50-hoursepower, four-cylinder Simplex, entered by the Palmer & Singer Manufacturing Company, and driven by George Robertson and Frank Lescault, evolved as winner of the 24-hour race promoted by the Motor Racing Association at the Brighton Beach mile course last Friday and Saturday. A 50-horsepower, six-cylinder Lozier, nominated by Harry A. Lozier and piloted by Michener, Mulford and Cobe, which won the 24-hour race run a fortnight before over the same course, was second. A 72-horsepower, six-cylinder Thomas Flyer, named by Harry S. Houpt Company, with Roberts, Salzman and Winters for its crew, finished third.

The three first cars all beat the previous world's record for a mile track of 1,107 miles, set up by Mulford and Cobe and the Lozier "six" in the former race—the Simplex, with a score of 1,177 miles and an average of 49 miles an hour; the Lozier, with 1,125 miles and 46.83 average, and the Thomas with 46.45 average. The following cars showed hour scores of 50 miles and over: Simplex, 57; Stearns, 57; Renault, 55; Lozier, 54; Zust, 53; Thomas "Six," 52; Fiat, 52; Cleveland, 50; Allen-Kingston, 50.

A 45-horsepower Renault, entered by Paul LaCroix and driven by Louis Strang and Charles Basle, the latter a racing pilot several years ago for H. L. Bowden's then famous Mercedes, figured prominently in the race for 17 hours, but was forced to retire the next hour owing to a broken connecting rod. It evolved as the one imminently serious disputant of the premiership of the Simplex in the race. It led, in fact, from the third to the twelfth hour, both inclusive, and incidentally took unto itself new records at all these points. At the end of the hour previous to its withdrawal it had a score of 851 miles, as against the previous record of 705 miles in 17 hours, with an average per hour of 50 miles.

In the battle of the tires, the Michelin carried off first honors, second place falling to the Continental, and the third car having for its equipment the Diamond.

Among those who like to see the honors of the racing game well distributed and perseverance receive at last its reward, the victory of the Simplex was a popular one. Charles A. Singer, its entrant, was warmly congratulated. He has been a liberal supporter of racing, but until this race had not landed the winner of an important event.

Robertson and Simplex.

The Simplex was originally the creation of Smith & Mabley. It has participated in one or more Vanderbilt Cup contests, and was a contender in the Briarcliff. Not a little of the ill-luck of the game, heretofore, has been its lot and kept from it a noteworthy victory. Its performance in the present race was most impressive. It ran like clockwork and seemed to have no end of speed.

The performances of Louis Strang and George Robertson, who are to have prominent mounts in the Vanderbilt, the former on Paul LaCroix's Renault and the latter at the wheel of A. L. Riker's Locomobile, were closely watched. Strang lost none of the reputation he made as winner of the Savannah and Briarcliff cups by his consistent work, and Robertson displayed, in addition to his determined fighting qualities, a continence that he has not shown before and is highly encouraging for his future success at the wheel. George Salzman and Charles Basle, too, other Vanderbilt drivers, piloted their mounts in heady fashion. It was more than once remarked by those that witnessed Montague Roberts' magnificent stern chase of the Lozier that the Vanderbilt would be a gainer were he once more to be at the wheel of one of its cars. By way of a pardonable grandstand play, Barney Oldfield was at the wheel of the luckless Stearns for an hour or two. Barney, however, had done some long-distance driving before in the Briarcliff.

One fatality in the killing of a special policeman in the pursuit of his duty on the track and an unusual number of rather serious accidents to the drivers, marred the sport. In the third hour of the race, T. F. Fickett, a special policeman employed by the promoters, started to cross the track from the field stand to the paddock, some say in pursuit of some boys encroaching on the track. Four cars were approaching almost abreast from around the turn at the head of the homestretch. According to Robertson's immediate report of the affair to the officials, Fickett was first struck by him, then by the Stearns, and then by the Cleveland. He was taken to the hospital tent, where it was found that he had both arms and the right leg fractured, four ribs broken, and concussion of the brain. He died the next afternoon at the Coney Island Reception Hospital. Upon his death Robertson was placed under technical arrest, though not put in custody.

In trying to dodge Fickett, the Simplex swerved into the Stearns and broke the left front frame member. Pieces were sent for to New York and inserted so that the

patched-up car appeared again on the track early the next morning. The frame was further patched up to enable Oldfield to drive it for an hour or two on Saturday evening. The car had been making a good showing, holding fourth place in both the first and second hours, with scores of 50 and 100 miles.

Smashing of Machines Began Early.

The smashing of machines had begun, however, before the race had even started. At dusk following the afternoon sprints, several cars came out on the course for trial spins. The Garford had forced its way on the track against rules, so says Tom Moore, and was ordered by him back into the paddock. It turned and ran up the course toward the camp's entrance gate. Just then Michener, who was rounding the turn with the four-cylinder Lozier at full speed, ran into the Garford. The results of the collision made it impossible for either car to start in the races. The frame and rear axle of the Lozier were sprung and its left rear wheel torn off. Two wheels were smashed on the Garford and its frame was put out of commission.

A long list of mishaps followed to other cars and men that will bear detailing at once that the story of the race itself may be reached and told without such unpleasant interpolations. The accidents must be told, however, since they account for practically only half of the 12 starters in reality surviving the struggle to the end.

At the 190th mile, the Lozier with Harry Cobe at its wheel, was hit in the rear by a pursuing car. The collision turned the Lozier around and headed it for the fence; one beam broke the steering wheel, while another beam went between Cobe's legs, and through the cushion, dented the gas tank and bent the frame in front. In a couple of minutes Cobe was again under way, driving with but two spindles in his steering wheel.

Between 2 and 3 o'clock on Saturday morning there was a perfect holocaust of disasters. At 2:35 o'clock Renault, No. 14, with Julian Bloch at the wheel, at the first turn had a tire blowout, which hurled the car into the fence and upset it. The upset and a fire that resulted made of the car almost a heap of junk. Bloch was rather badly burned about the face in attempting to quell the flames. Five minutes later the Zust in trying to avoid the Renault wreck blew out a tire and ran into the fence opposite. It was so badly battered that a new front axle, a new wheel and a new radiator had to be put in. When it was thought to be ready to run, the magneto was found to be wrong, and the motor could not be timed.

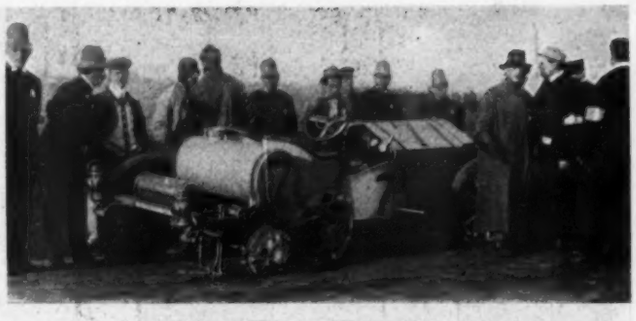
About this time the Cleveland also hit the fence 25 feet beyond. The fence rail passed through the radiator and the rear twin cylinders were so badly injured that a new motor and radiator had to be inserted. Then, after running for three miles, trouble developed in the transmission. A new one was put in.

The Fiat had to retire at 3:30 A. M., owing to the connecting rod breaking, through lack of oil. Practically the same cause put the Strang Renault out of the race, also with a broken connecting rod. The temptation to run without replenishing fuel proved fatal, it will be remembered, in the last race to the Allen-Kingston and the Simplex. Mr. LaCroix, however, says that the Renault's oil feed broke.

At 7:15 A. M. the Acme, at the upper turn, had a right rear tire blow out and skidded in the sand into the fence. It smashed a wheel and so deranged the motor that the car was withdrawn. At 8:15 A. M. the six-cylinder Thomas's right rear tire blew out and turned the car through the hole in the fence made by the Lozier. Though the post was cut off, the machine was not injured. Roberts jumped to the seat and relieved Salzman.

On Saturday afternoon the Garford, having replaced the entire rear construction broken in its collision with the Lozier before the race started, returned for a run to the finish, but soon had to retire owing to its clutch having burned out.

Toward the close of the race the hiatus of accidents was brought to an end by the Zust, whose pilot was T. W. Post, formerly connected with the automobile tire industry and known to the old cycle contingent as cycling editor of the Brooklyn *Eagle*. It ran into the fence on the backstretch. Charles Brown, the



Acme After Its Drive Through the Fence.

mechanic, was thrown out and had his arm broken. Mechanics and drivers of other cars, which dove through the fence, received scratches, cuts, and bruises that do not need cataloguing.

The race, though far bigger, finer, and more filled with thrills

Down and Out Renault Looked Forlorn.

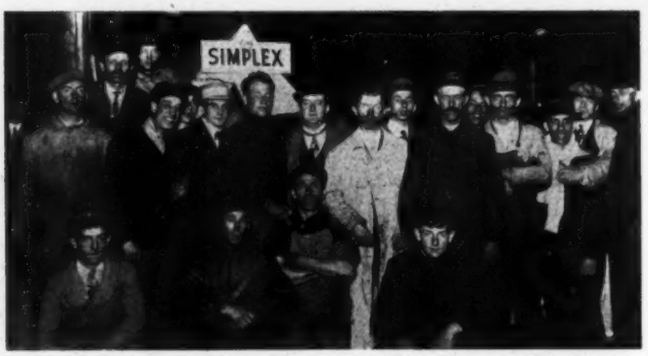
than the first one, was not the money winner that the initial meet was. The attendance at the curtain-raising sprints on Friday afternoon and during the early afternoon of Saturday suffered badly by comparison with that at the last meet. Nor was the opening night attendance nearly so large. The weather,

Tire Repairing Interested Camp Hangers-on.

however, had much to do with the latter, for an icy wind that chilled all hands to the marrow swept across the field from the north. Still there was a good, big crowd of six or seven thousand well wrapped in coats, sweaters, and furs on hand. On

Fire Brigade Alert for Hurry Call or Photo.

Some of the Faces the Flashlight Revealed.



Robertson and Boys That Helped Him Win.

Saturday the weather moderated and a crowd of perhaps 12,000 saw the wind up.

The M. R. A. made noteworthy improvements in the excellent arrangements of the meet. There was much added lighting. A praiseworthy taximeter scoring system was installed that showed the standing of the cars at all times. Each car had its own board and scorer, the figures being changed by "spools." More beds than before were installed in the dormitory. It is respectfully suggested, however, to the management that in future admission badges to the "sleeping" room be confined to the officials and newspaper men, for whose comfort the dormitory was arranged at considerable expense, and that its privileges be denied to scorers and minor officials, made up largely of young men preferring a noisy night of fun to the sleep sought by the tired judges, timers, and scribes, rendered impossible by the noisy antics of the effervescent youths aforesaid.

On the pretense of awaiting repairs to the Garford that would make it possible for Mr. Hurlbert's car to compete, the start of the 24-hour race was delayed until 8:45 o'clock. At the shriek of the signaling horn, George Robertson made a quick jump and had sneaked across to the pole on the first turn with the Simplex before the other pilots knew just what had happened. He raced down the backstretch in the lead, followed by "Monty" Roberts in the Thomas "Six" and Laurent in the stearns. This trio not only finished the first lap in this order, but kept it for 5 miles. Then Roberts sprinted to the fore and led at 10 miles in 11:32. In the early sprinting, however, the Simplex had been showing miles in 58 seconds. Roberts led at 20 miles, also in 22:23. Then Robertson went to the head and got a firm grip on the lead, and in the meanwhile Strang had worked through the ruck into second place. The simplex made 25 miles in 27:33 and 50 miles in 54:31.

Order at End of First Hour

The order at the end of the first hours was: Simplex, Strang, Lozier, Stearns, Roberts, Fiat. The same order exactly ruled at the end of the second hour. There was a gap of 12 miles between the leaders and the pursuing bunch. Thus early the chaff had been winnowed from the wheat, and the likely leaders separated from those with but one or two exceptions with any chances of figuring otherwise than as mere "also rans" in such fast company as this pacemaking sixtette.

The promises of a knockout pace that should dispose of the weaker brethren early in the struggle were, indeed, being fulfilled. Robertson set a terrific clip with the Simplex, 55 miles the first hour and 107 the second, as against 52 and 101, the former figures. All this time Strang was hanging on like grim death with the Renault, with the record-holding and victorious Lozier chasing swiftly at their heels.

In the third hour Strang went to the fore, and the Lozier got by the Simplex also. The next hour, however, the Simplex became the runner up and "Monty" Roberts supplanted Mulford as pursuer. It was a stubborn all night and early morning struggle with the Renault setting the pace for the Simplex, and the Lozier and Thomas alternating as pursuers. In the fifth hour the Fiat had forced itself into third place, and was beginning to look dangerous, when its connecting-rod calamity came and put it out of the running.

The thirteenth hour proved a luckless one for Strang, for while the Renault was in camp, the Simplex secured the lead that it never lost to the finish. From that point on the French car got no nearer the American machine than 3 miles; was at times 10 miles behind, but, as a rule, but five measly little miles to the bad that a stop for a tire or oil could wipe out.

The excitement of the race between Renault and Simplex and Strang and Robertson was at its height, when the Renault, in the eighteenth hour, turned into the paddock and word came that its connecting rod had broken and that it was out of the race altogether. The disappointment of the crowd was keen and the sympathy for the popular French sportsman was general. Then attention was turned to an equally stubborn duel that was in progress between Michener and Mulford in the Lozier and Roberts and Winter in the Thomas for second and third money, for Robertson had an hour margin and only had to keep up a

Night Scene from Grandstand Was Weird.

Taximeter Boards Showed Each Car's Tally.

Renault Leading Simplex Into Homestretch Pursued by Thomas on the Pole and Lozier Outside.

fairly fast clip and take no chances to win out comparatively easy. This he did, but with the exit of the Renault and the slowing down of the Simplex all hopes of a 1,200 miles score and a 50 miles an hour average were abandoned. Up to the withdrawal of the Renault the pace set had been a bit faster than a half century an hour.

Roberts in endeavoring to close the 10-mile gap that separated the Thomas from the Lozier furnished the excitement of the wind up. His game chase made him a favorite with the crowd. Roberts got as close as four miles to Michener in the twenty-third hour. It was this desperate sprinting to catch up, however, that put him ahead of the old figures and in the trio of record breakers. A half an hour before the finish the referee ordered the Stearns and Zust off the course under the rule permitting the barring of contestants that had no chance to win and might interfere with or endanger the other contestants.

"Barn-Stormers" Won Short Events.

The feature race of Friday afternoon's curtain raising program was the 50-mile free-for-all. It had for starters the Barney Oldfield-Charley Soules combination, driving six and four-cylinder Stearns stock cars, respectively; Harry Kirkpatrick, Hotchkiss; Harry Roux, Mercedes; Steinwitz, Mercedes, and Ray Howard, Palmer & Singer. It was an easy one-two win for the "barn-stormers" and the Stearns, Barney winning in the excellent time of 50:42, with Soules second in 51:34 4-5; Roux third in 52:06, and the Palmer & Singer fourth in 54:46.

That Oldfield had lost none of his popularity with New Yorkers was evidenced by his cordial greeting when he appeared with a linen duster, the inevitable cigar, and his Stearns "six" to face the starter for the five miles for six-cylinder cars. He greatly pleased the grandstand by making a runaway of it by a quarter of a mile in 5:20 2-5, despite the fact that he mistook the checkered last lap banner for the finish flag and had to be told to go on when he slowed down. His time for four miles was 3:52. Harry Kirkpatrick in a Hotchkiss stock car was second, and Ray Howard in a Palmer & Singer third.

The Fiat pair had a try against Christie's mile track record of 54 seconds. George Robertson, in the Tornado, scored 58 seconds and Ralph De Palma succeeded on the Cyclone with a mile in 52 2-5 seconds. In a match between these two at 10 miles, the Cyclone was cut loose and won in 9:45, the Tornado having stopped in the fourth mile owing to a broken gasoline lead.

PENALIZATIONS FIRST DAY OF CHICAGO RUN.

CHICAGO, Oct. 6.—The 1,000 miles four-day reliability test of the Chicago Motor Club started this morning, and at the close of the first day's run of 262 miles over the Kenosha-Janesville-Rochelle circuit thirteen of the seventeen contesting cars still had perfect scores. Of the four that were penalized, the Maxwell two-cylinder touring car experienced cabureter trouble, water getting into the mixture, which cost 24 points to correct. The No. 3 Mason was penalized 66 points for oiler trouble, while the Studebaker touring car lost a pin out of its differential, causing it to be laid up at Janesville. Its penalty has not as yet been announced, but it is the intention to start again to-morrow. The Reliable Dayton buggy had not reported at a late hour to-night. The other thirteen cars have perfect scores as follows: No. 4 Mason, Apperson Model O, Midland, Pierce Arrow roadster, Haynes roadster, Premier roadster, Rainier, the two Whites, Franklin, Haynes touring car, Marmon, and Pierce Arrow big six touring car.

Two of the entrants were scratched, the Knox because of not having a driver and the Premier touring car because it did not arrive in time from Kansas City.

Paul LaCroix, Strang (head turned), Basle (left).

There Were Very Busy Times in Tiretown.

THE TABULAR STORY OF THE 24-HOUR RACE, HELD OCTOBER 1-2, AT BRIGHTON BEACH RACE TRACK.

No.	CAR	Drivers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
6	**SIMPLEX**	Robertson, Lescault.	55	107	143	198	255	302	350	401	454	508	559	612	658	710	761	810	856	903	949	992	1,041	1,086	1,131	1,177
2	**LOZIER**	Mulford, Cobe, Mitchener	51	101	153	191	228	279	329	381	414	468	513	562	611	650	702	742	791	840	888	933	981	1,031	1,075	1,125
8	**THOMAS**	Roberts, Winter, Salzman.	49	99	151	193	235	286	329	374	423	470	516	565	600	650	690	738	786	837	877	928	973	1,022	1,071	1,115
11	**ALLEN-KINGSTON**	Lanwell, Rippigill, Pepperday.	42	74	91	94	128	148	185	237	287	328	372	413	451	495	533	579	615	660	710	750	796	827	874	907
9	**CLEVELAND**	Chevrolet, Miller, McMann.	43	88	137	187	231	263	263	263	263	266	266	266	267	311	347	361	392	437	475	513	543	583	625	632
5	**RENAULT**	Strang, Basle.	54	105	158	211	265	305	356	408	455	506	558	613	655	705	758	802	857	888	Broke connect'g rod; withdrew					
4	**STEARNS**	Laurent, Marquis, Oldfield.	50	100	131	131	131	131	131	131	184	241	254	254	255	268	268	268	268	287	339	383	429	480	509	519
15	**ZUST**	Post and Natien.	46	52	82	121	174	212	217	217	217	217	217	217	217	217	228	232	269	285	308	333	370	396	421	
7	**ACME**	Patschke and Rodgers.	35	62	84	109	143	184	204	233	245	293	309	Withdrawn												
3	**FIAT**	De Palma, Capra and Hawley.	48	99	167	185	237	283	303	Broke connecting rod; withdrawn																
14	**RENAULT**	Bloch and Clement.	43	83	123	176	221	255	Overturned and destroyed by fire																	
12	**THOMAS**	Martin and Blanchard.	35	35	70	116	158	177	179	188	205	206	Withdrawn													
10	**GARFORD**	Young and Doty.	..	..	..	..	..	..	..	..	..	..	..	..	..	43	47	Withdrawn								
	Old Record		52	101	146	193	245	294	332	380	423	465	515	563	616	664	706	755	803	849	883	928	972	1016	1,060	1,107

THE STRUGGLE FOR THE LEAD.

Hour	First	Miles	Second	Miles	Third	Miles	Former Record
1	Simplex	55	Renault	54	Lozier	51	52
2	Simplex	107	Renault	105	Lozier	101	101
3	Renault	158	Lozier	153	Simplex	143	146
4	Renault	211	Simplex	198	Thomas	193	193
5	Renault	265	Simplex	255	Fiat	237	245
6	Renault	305	Simplex	297	Thomas	286	294
7	Renault	356	Simplex	345	Thomas	329	332
8	Renault	408	Simplex	396	Lozier	381	380
9	Renault	455	Simplex	449	Thomas	423	423
10	Renault	506	Simplex	503	Thomas	470	465
11	Renault	558	Simplex	554	Thomas	516	513
12	Renault	613	Simplex	607	Thomas	565	565
13	Simplex	658	Renault	655	Lozier	611	616
14	Simplex	710	Renault	705	Lozier	650	664
15	Simplex	761	Renault	758	Lozier	702	705
16	Simplex	810	Renault	802	Lozier	742	755
17	Simplex	856	Renault	851	Lozier	791	803
18	Simplex	903	Renault	888	Lozier	840	840
19	Simplex	949	Lozier	888	Thomas	877	883
20	Simplex	992	Lozier	933	Thomas	923	928
21	Simplex	1,041	Lozier	981	Thomas	973	972
22	Simplex	1,086	Lozier	1 031	Thomas	1,022	1,016
23	Simplex	1,131	Lozier	1,075	Thomas	1,071	1,060
24	Simplex	1,177	Lozier	1,125	Thomas	1,115	1,107

HOW NEW 24-HOUR RECORD SLATE READS.

Hour	New Record		Old Record
1	55	Simplex, Robertson and Lescault	52
2	107	Simplex, Robertson and Lescault	101
3	158	Renault, Strang and Basle	146
4	211	Renault, Strang and Basle	193
5	265	Renault, Strang and Basle	245
6	305	Renault, Strang and Basle	294
7	356	Renault, Strang and Basle	332
8	408	Renault, Strang and Basle	380
9	455	Renault, Strang and Basle	423
10	508	Simplex, Robertson and Lescault	465
11	559	Simplex, Robertson and Lescault	515
12	613	Renault, Strang and Basle	565
13	658	Simplex, Robertson and Lescault	616
14	710	Simplex, Robertson and Lescault	664
15	761	Simplex, Robertson and Lescault	706
16	810	Simplex, Robertson and Lescault	755
17	856	Simplex, Robertson and Lescault	803
18	903	Simplex, Robertson and Lescault	849
19	949	Simplex, Robertson and Lescault	883
20	992	Simplex, Robertson and Lescault	928
21	1,041	Simplex, Robertson and Lescault	972
22	1,086	Simplex, Robertson and Lescault	1,016
23	1,131	Simplex, Robertson and Lescault	1,060
24	1,177	Simplex, Robertson and Lescault	1,107

BAY STATE ENDURANCE TIE FINALLY CALLED A DRAW

BOSTON, Oct. 3.—The endurance test of the Bay State Automobile Association, which started as a twenty-four hour endurance run, but which developed into a contest of over 1,600 miles and the hardest test ever given motor cars in this country, was concluded Thursday evening when the three cars, which for eight days had survived every task set for them and had retained perfect scores to the end, were withdrawn by their owners with the consent of the committee.

These cars are the Franklin and Studebaker tourers and the Shawmut runabout. The Franklin was driven by Carris of Transcontinental and Glidden tour fame, and Burns; the Studebaker by W. G. Jones, and the Shawmut by Harold Church. When they were withdrawn they had covered 1,607 miles without an adjustment, repair, or replacement, and had made every control on time, their scheduled running time being about ninety hours and their actual running time considerably less. Having given this demonstration of reliability, the owners of the cars, the Franklin Automobile Company, Studebaker Automobile Company, and Shawmut Motor Company, respectively, felt that it was useless to continue the contest, as the cars were in first-class shape and apparently could keep on indefinitely. The committee had already set up the running schedule to the limit allowed by law and had selected as bad roads as it was possible to find, including mountain grades, sandy and rough going; the cars had been driven in blinding dust and in thick mud, and there seemed nothing more within reason that they could be called upon to accomplish.

Of the twenty-one cars that started, sixteen were penalized, but the penalties in only five cases can be chargable to structural or mechanical trouble. In the other cases such things as dust clogging the carbureter, gasoline failing to feed on a long hill or owing to the position of the cars caused motors to stall and points to be scored against the machines. Two cars were put out by broken wheels, one of the Overlands suffering this misfortune near the end of the original run, and F. E. Wing's Glidden tour Marmon being put out by this mishap in Monday's run-off to Portland and return. The Stevens-Duryea went down because of a leaky gasoline connection, and the Chalmers-Detroit had transmission trouble. The Oldsmobile broke a spring in the first run-off. The Pierce and the Fosdick Lancia were eliminated by failure of the gasoline to supply the carbureter owing to the angle at which the cars happened to be standing, and the Hilliard Lancia and the Rambler were penalized for stalled engines due to dust in the carbureter. Two Overlands and a Buick did not finish the first day's run, and another Buick was put out of business by a collision with a horse. The Cadillac and the Corbin were late at controls and lost points in this way, the lateness being caused by the drivers losing their way in the dark. The Shawmut touring car was also scored against for lateness, the car having been stuck in sand. The Buick and Reo runabouts, which finished perfect in the original run, did not participate in the run-off.

The trophy has not yet been awarded, and ways and means are now under consideration for properly recognizing the merit of the three machines which went through with perfect scores.

Preparations are complete for the great balloon race for the Gordon Bennett trophy, which will be held in Berlin, Germany, October 11, under the auspices of the Berlin Aero Society. It is expected Emperor William and the Crown Prince will be present.

HORSE-POWER RATINGS OF AUTOMOBILE MOTORS*

By THOS. J. FAY, President Society of Automobile Engineers.

IN finishing cylinders, if the stroke is great, the bore will be conical, since finishing to a considerable depth in a blind hole evolves conical results. Many claim to be able to finish to a fraction of a thousandth, even if the stroke is very long; doubtless they can, but not at a cost allowable in practice. There are a large number of parts in an automobile, and the cost of the finished product must be very low in comparison. The design of each part must be such that the work can be done by men available in the open market. Leakage is more of a detriment in the long stroke motor, because there is more time in which the mixture may escape. If the long stroke motor is more difficult to finish, the chances of leakage are greater. It follows, therefore, that the initial (apparent) advantage is, to some extent, at any rate, a theory. It is not the purpose here to make predictions, but to call attention to the two sides of the matters to be considered by the designer before he commits himself, especially in view of the fact that once the design of a motor is crystallized, it is then too late to make any substantial change.

Regarding Torque vs. Speed.

For a given horsepower, the motor in which the torque is a maximum should prove the most attractive, for reasons as follows:

(a) It will then be the more difficult to "stall" the motor.

(b) The motor will run slower without "laboring."

(c) The motor will start with a greater load at a slower speed.

(d) The motor will be more capable of extracting the car out of high resistance portions of the roadways.

Torque is the product of piston area times mean effective pressure; horespower is the product of torque and speed. It is plain then that piston area is of the greatest importance, under such conditions, and even if the stroke is short, the torque will not diminish until the speed is quite high, whereas the advantages enumerated are all with the lower range of speeds where the effect of diminishing torque will not be noticed.

As between a short-stroke motor with a considerable piston area and a long-stroke motor with a diminished piston area, the short-stroke motor is the superior of the two in automobile work from these points of view, at any rate. For the same power, the short-stroke motor must be of the greatest piston diameter, hence of the maximum torque (at the lower speed range). If the bore of the short-stroke motor is greater for a given power, then the valves can be of greater area and the mixture losses will be a minimum.

The result is, all things considered, that the long-stroke motor shows its disadvantages only where the bore is the same for both, and the author is not in a position to make the k values in his formula differ, in view of a difference in stroke, on a basis as shown in the curve, Fig. 1, since designers are not compelled to accept the conditions there set down, i. e., the same bore for both the long- and the short-stroke motors, considering a given horsepower rating. One point more: torque is not limited by speed, as we are accustomed to regard it, unintentionally perhaps, although the torque does diminish as the speed increases. It is the tortuous passages and the obstruction offered by the valves that does more to suppress the torque than any other influence. Were the valves of the same area as the pistons, and the manifolds so short and straight as to offer no appreciable resistance to the flow of the gases, the torque would remain nearly constant at all speeds. On the other hand, it is the automobile that makes the least noise, that is the most desirable. If the valves are quite large, have strong springs, and the compression is good, speed and noise are then companions. Noise, in itself, is rather a bad phenomenon, for the very good reason that the mechanical losses in machinery are indicated by heat and noise.

There is a limit to the sizes of the valves then, hence the torque will fall off at the higher speeds, not because of the speed *per se*, but for reasons incident to the construction of the valves. On the other hand, there are limits of speed, one of which is the diminishing torque, another being the ills of the inertia component. Were it possible to so design a motor as to eliminate the weight of the moving parts, there would be no limit to the speed on that account. The speed would still be limited, however, by the falling torque, due to the inability of the explosive mixture to follow quickly receding pistons. The largest valve diameter found in practice is one-half the diameter of the piston, while the smallest equal one-quarter the piston diameter. This is a vast difference in practice, if we but take into account the fact that the area varies as the square of the diameter.

Influence of the Valve Lift.

If a valve lifts the equivalent of one-quarter of its own diameter (flat seat), the area of the opening will be approximately equal to the area of the valve, while if the valve is half the piston diameter, its area will be equal to one-quarter the piston area. But valves do not lift the equivalent of their own diameter, nor are most of them flat-seated. The actual lift is seldom more than ⅛-inch, at the most. The larger the valves, the more the lift is diminished to obviate noise, so it would seem the available space through which the mixture must "sift" is but small, indeed. Fortunately, the mixture is under pressure, or impelled by a vacuum, which amounts to the same thing. The exhaust is under pressure (terminal pressure) and in the four-cycle motor the piston sweeps the gases out. These are matters that influence the torque, hence the horsepower rating, and, it is more to the point to give them close attention than it is to browse over formulæ, with a view to predicting the probable commercial rating of a motor; it is the motor that must deliver the power rather than the formula. The time the valves are open is also of the greatest importance, no less than the relations of opening and closing to the travel of the piston. If the valves are small in proportion, and the lift limited, to afford the best possible results, the time of actual opening is the only remaining loop hole through which the designer can mount to success. An inlet valve, for illustration, should open at the beginning of the suction stroke, and should remain open until the piston compresses the mixture sufficiently to render the sum of the opposing pressures equal to zero. On the other hand, the exhaust valve should open toward the end of the expansion stroke (not at the end), at the point where to be rid of the exhaust gases is of greater importance than the balance of the work represented

*Continued from page 467 of "The Automobile," October 1.

Correction.—On page 430, issue of The Automobile, September 24, the last bracketed part for the horsepower formula, reads:

$$\left(\frac{H.P. \times 33{,}000}{2\pi R P}\right)$$

It should read:

$$\left(\frac{H.P. \times 33{,}000}{2\pi R S}\right)$$

The equals sign in the formula for R is incomplete. As printed it reads minus.

On page 465, issue of The Automobile, October 1, the horsepower formula (Prony brake) reads thus:

$$H.P. = \frac{2RSP}{33{,}000}$$

It should read:

$$H.P. = \frac{2\pi RSP}{33{,}000}$$

T. J. F.

by the terminal pressure. The exhaust valve should stay open as long as possible, which is up to the time of the inlet's opening.

Few, indeed, are the motors in which this question is so thoroughly disposed of as to require no further attention. The timing of the spark is also open to investigation. As the speed increases, the spark must be advanced, else the propagation of the flame will be ill timed, the mean effective pressure will be lowered, and the power of the motor will be reduced, as indicated by a falling off of the torque.

Fig. 3 shows the phenomenon due to late spark, in which it will be observed the pressure not only fell off, but the flame propogation was delayed. This decreases the power, in that the torque will be much diminished. When this condition obtains in a motor, it is persistent, and, as a rule, due to defective equipment, so that the operator is rarely able to so "tune up" as to eliminate the defect; the sparking equipment is more likely not what it ought to be.

Harmonizing the Car and Its Motor.

There are two conditions to be satisfied as respects the motor in conjunction with the car. The motor must be equal to the occasion when the car is running at its maximum speed, and it must have sufficient flexibility to enable the operator to run the car at speeds below the maximum Involving the maximum

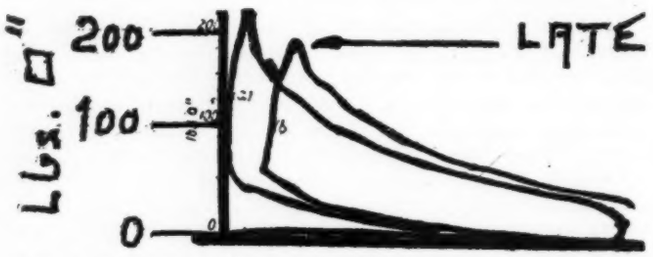


Fig. 3—Showing a late spark resulting in a reduction of torque, hence of power as well. (This drawing was originally the work of W. Watson, presented in a paper before the Royal Automobile Club of Great Britain, February 21, 1907.)

speed, the gear ratio must be that which will end in a zero equation, if the power of the motor is indicated, plus the resistance of the car. This is not always so, and the result is the motor is not allowed to do as well as it really could under better conditions.

If the —horsepower of the car equals the + horsepower of the motor, the gear ratio will be the ratio of the crankshaft to the driven wheels of the car when the car is moving as fast as it can impelled by the motor delivering its highest power. Taking this as a statement of fact, it is easy enough to devise a formula to satisfy the conditions of a zero equation.

If we say $-\text{H.P.} = \dfrac{2\pi R' S\left(\left(\dfrac{\left(\frac{33{,}000}{88}\right)\left(\frac{H.P.'}{Q}\right)}{M}\right)\right)}{33{,}000}$, in which:

$-H.P.$ = the resistance offered by the car in horsepower.
R' = the radius of the driven wheel in feet.
S = the speed in r.p.m. of the driven wheels.
Q = the mechanical efficiency of the transmission system.
M = the speed of the car in miles per hour.
*$H.P.'$ = (in brackets of the formula) the horsepower as measured at the contact of the tires and road bed.

The (plus) horsepower of the motor must equal the requirement as above set down, and for convenience, it will be well to distort the same formula, with a view to deriving the horsepower of the motor, thus:

$$+H.P. = \frac{2\pi RSP}{33{,}000}, \text{ in which}$$

$H.P.$ = the actual delivered horsepower of the motor.
R = the radius in feet = unity.
S = the angular velocity of the crankshaft in r.p.m.
P = torque.

*H.P.' includes wind resistance. This horsepower, plus the loss in transmission, must equal the horsepower of the motor, as measured by a dynamometer.

By way of an example, it will be something to set down the known values before arranging them, thus: $\frac{33{,}000}{88} = 375$

Q = 80 per cent; it may be higher or lower in different cars, but the value taken will serve in general.
$2\pi = 6.28$.
$R' = 1.5$; R' depends on the sizes of wheels used on cars; in this case 36-inch wheels will be taken.
S = 560.5 revolutions per minute, for 60 miles per hour.
$H.P.' = 36$.

With the known values thus available, it will be an easy matter to insert them in the formula and solve for horsepower thus:

$$H.P. = \frac{6.28 \times 1.5 \times 560 \times \left(\dfrac{375 \times \left(\frac{36}{80}\right)}{60}\right)}{33{,}000} = 45.$$

For the motor we would have:

$$+H.P. = \frac{2\pi RSP}{33{,}000} = 45 \text{ horsepower, in which}$$

$2 = 6.28$.
R = unity = 1 foot.
S = 1,120.

$$P = \frac{45 \times 33{,}000}{6.28 \times 1{,}120} = 206.8+$$

The gear ratio would have to be as 560 : 1,120, or as 1 : 2, in order to permit the motor to run at its best speed with the car making 60 miles per hour. Any other gear ratio would defeat the plan, whether up or down, since there would be only one speed at which the motor would deliver its maximum power, which it would have to do to equal horsepower = 45.

The second condition to be satisfied takes into account the flexibility of the motor, in order that the car may run at less than the highest speed the motor is capable of dictating, under conditions of a correct gear ratio. This second condition is rarely, if ever, satisfied in practice, for if it were there would only have to be one set (couple) of gears in the transmission. In practice it is considered the highest attainment if the motor will enable the driver to negotiate all road conditions on the high gear. The maximum flexibility of the motor would then be in evidence and this would be a condition, induced by a motor characteristic showing increasing torque with decreasing speed.

Some General Motor Considerations.

Here is evidence of the desirability of a motor of maximum bore and minimum stroke. The torque would tend to hold in proportion to the square of the bore and would recede with the speed, after a certain speed is attained. Of course, on the boulevards, flexibility would be assured, irrespective of the shape of the torque curve, since the torque would not be lower at the lower speeds than that of the highest power speed. The car takes power greater than in direct proportion to speed on a given level road and this fact would assure flexibility on good level roads. It is when it becomes necessary to go slower in bad roads that the higher torque is a necessity and it is the motor with the maximum bore for the power that will be the most likely to favor this road condition.

Thus far it has not been necessary to specifically consider the number of cylinders best suited to the problem. Indeed, it is a fact that the abstract question is independent of the number of cylinders. In practice, however, it has been found that the weight efficiency is influenced by the number of cylinders. It is purely a matter of weight efficiency then that influences the cylinder question, barring the matter of the space available plus style and trade considerations. As a purely engineering proposition, the number of cylinders to use will be the number that will afford the highest weight efficiency, coupled with a practical thermal efficiency. There is no chance of any motor, of any number of cylinders, being superior merely because it has so and so many cylinders. The "I-saw-it-first" idea is not an engineering proposition at all, nor can it have any bearing on the situation in the long run.

If a single-cylinder will suffice for the purpose, it is the best to adopt, but if it will not, then to use two cylinders would be the natural sequence. Should the situation demand more than two cylinders, it is to four that one should look, then to six, and finally to eight. With a single-cylinder motor must be included a flywheel of a weight capable of completing the cycle, and when the excess of flywheel weight amounts to more than the second cylinder, it is the two-cylinder motor that is wanted. Likewise, as the power requirement is advanced, the conditions naturally indicate more cylinders.

As the number of cylinders increase, the torque impulses are multiplied, and as they spread around the circle, the need of flywheel effect gradually recedes until with enough cylinders the flywheel ceases to be of value, except while the motor is being started, during which time the flywheel serves a useful purpose, since the initial effort, in the absence of any flywheel effect, would be beyond the average motorist. To entirely do away with the flywheel, neglecting the question of cranking, is a matter not worth discussing, because more than eight cylinders would be required and the author is willing to go on record as responsible for the prediction against the chances of any one ever wanting a greater number.

The argument in favor of a plurality of cylinders is as simple as can be. A ship will make headway in a steady wind that cannot be made in a series of gusts of wind. It will stand up under all the air that goes to make a hurricane if delivered at a steady rate, but not otherwise. Likewise, the mastery of the energy stored in the fuel is best managed in small increments, multiplying the number of impulses to the maximum, bearing in mind that complicated mechanisms are to be avoided, when possible to do so. It would be vain to jump to the conclusion that this simple way of viewing the matter argues for multiple cylinders at once and for all. The facts are quite opposite. If in a multiple cylinder motor certain sizes of cylinders will serve the purpose well, any less number of cylinders of the same size will serve the purpose equally well if power requirement is reduced in direct proportion to reduction in number of cylinders.

As the number of cylinders is reduced, the flywheel effect must be increased, and the proper guide is the weight efficiency on roads such as America affords; in lands where fuel is high and road making has been advanced, it is the thermal efficiency that should remain uppermost in the mind's eye of the designer. It might be said a single cylinder could be so large as to preclude the chance of rendering the motion steady, which would be quite true in the absence of enough flywheel effect to complete the cycle within the limits of "speed fluctuation," called steady when referring to a motor with a plurality of cylinders.

There is no device available that will so readily, and so evenly part with its energy as a rotating mass in the form of a flywheel. Overlapping impulses, as in a multiple cylinder motor, is a crude device in comparison with flywheel effect. The disadvantage of the flywheel lies in the weight required to do the work, and weight efficiency is of such great moment as to preclude the use of sufficient mass to render it feasible to use cylinders large in bore and small in number beyond certain limits.

Some single-cylinder cars are not as steady as cars with multiple cylinders, but only because the flywheel effect is inadequate for the purpose. In such cars, the flywheel weight is stinted, and properly so, since the cars are heavy enough as they are. They merely emphasize the question of the desirability of weight efficiency.

[In later issues, the influence of the carbureter, the fuel, and the electrical problems entering into the subject will be separately discussed.]

S. A. E. TO MAINTAIN EMPLOYMENT BUREAU

AMONG numerous other activities, the Society of Automobile Engineers will henceforth maintain an information bureau for the mutual benefit of members seeking positions and of the manufacturers in need of additions to their technical staffs. As a matter of fact, American automobile manufacturers are now very largely represented in the membership, so that the innovation will result in benefiting members both ways. The names and qualifications of those seeking new positions will be kept on file, as will also the needs of makers desirous of filling vacancies in their engineering departments, or of employing additional men, and both will in future be published in the quarterly transactions of the Society.

In view of the peculiar status of the automobile industry where a supply of competent technical help is concerned, due to the extremely rapid growth of automobile manufacturing in this country, there is little doubt that this move on the part of the Society should meet with the approval and support of the industry as a whole. With the active co-operation of manufacturers, whether members of the Society or not, and of those members who are interested in this, there appears to be no reason why it cannot be put on a practical working basis in a very short space of time, and the results will undoubtedly be of a nature to benefit all concerned, as well as to increase the already rapidly growing influence of the Society of Automobile Engineers.

AUSTRIA'S AUTOMOBILE TRADE FIGURES.

The Austrian Chamber of Commerce has just published the statistics for the first six months of 1908, which show a general improvement, both in the import and export trade, the former being especially on the increase. The figures for the period stated are 5,575,180 kroners this year, as against the same time in 1907, when the value of goods imported came to 3,260,400 kroners. Germany leads the way in cars de luxe, commercial vehicles and engines, supplying 141 of the cars to France's 90 and Italy's 64. The remaining 22 are divided between the United States, England and Switzerland. The German Empire imported 14 commercial vehicles and 74 motor cycles into Austria.

The export trade shows figures to the extent of 1,930,750 kroners, a rise of 242,650 kroners in comparison with the first half of 1907. No business was done with the United States as far as cars are concerned, Germany again being the best customer, but four motor cycles were forwarded to America. The motor cycle export shows an astonishingly small total, only 80 in all, and yet cycle building is one of Austria's strong points.

SPECIAL LOCOMOBILE FIRE FIGHTERS.

BRIDGEPORT, Conn., Oct. 5.—They are now building at the Locomobile factory no less than three special fire-fighting automobiles for service in various New England towns. One of these is a hose-wagon for the town of Waterbury, Conn., designed to have a capacity of 1,000 feet of 3-inch hose beside its crew, and a second is to be a combination chemical extinguisher, ordered for service in New Bedford, Mass. Both are being built on the regular 40-horsepower Locomobile chassis with special bodies designed to fit the requirements of fire-fighting service. A most unusual feature to be found on them is the fitting of 40 by 6-inch Fisk tires on the rear, and 40 by 5½-inch tires on the front wheels, the equipment being the same in each case. The third car is being built for the city of Bridgeport, which already has several cars of the same make in its fire department.

As the Austrian Emperor has just given his sanction, the Austrian motor liability law will come into force November 1. This measure will have a grave bearing on the home industry.

USEFUL THINGS FOR THE AUTOIST TO KNOW

A LOW-TENSION magneto of early type may frequently be considerably improved by rewinding the armature with fine wire to give a higher voltage when cranking. The following directions will apply to such a case, and also to rewinding when the armature coil becomes damaged. In case it is desired to wind with

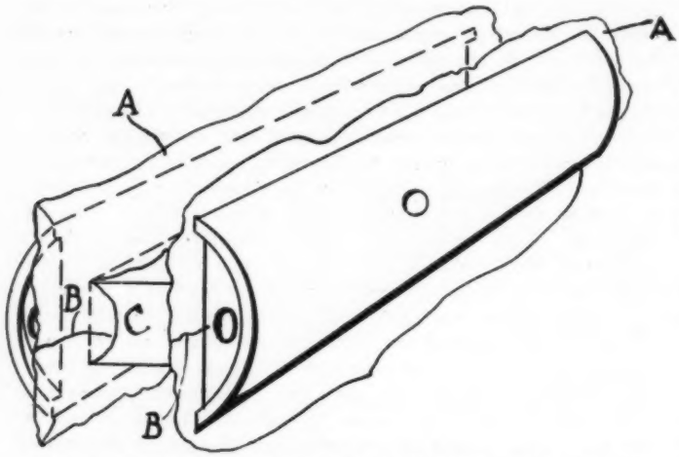


Fig. 1.—Showing the first step in insulating A A, pieces of muslin, cut to B B to enable them to be slipped over core. C, central body of core.

smaller wire, the wire already on the armature should be stripped clean of insulation and calipered with a micrometer to determine its size. If it is an even size—28 or 30—it is probable that the next smaller even size will be suitable. The new wire should not be less than half the sectional area of the old, and about two-thirds more will probably be right. After the old wire has been stripped off, new insulation will be necessary next to the core. Fig. 1 shows the first step in insulating. First the inner end of the wire is soldered to the core, and then pieces of muslin, A A, are slipped over the core, being cut at one point, B B, to enable this to be done. Three such pieces are put next to each pole, with the cuts B coming alternately at opposite ends. Next a strip of muslin slightly wider than the core is wound tightly three or four times around the central body C of the core. After binding it with thread all the muslin is shellacked.

The winding process is best done in a lathe; see Fig. 2, in which the dotted lines indicate the dead center. The core is rotated backward, by crossing the lathe belt if necessary, and the wire is wound as smoothly as practicable, like thread on a

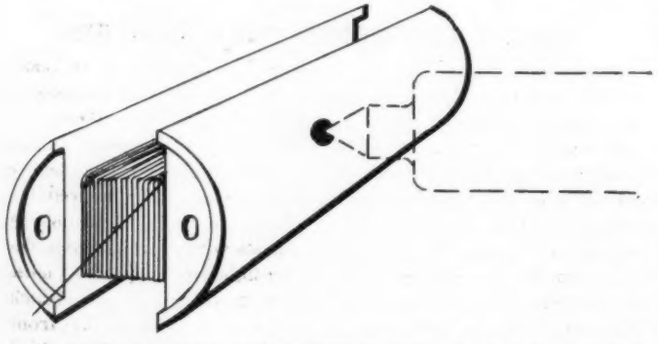


Fig. 2.—Showing the winding process with use of lathe. Dotted line indicates the dead center.

spool. To hold the wire while it is being wound on, take a piece of cloth folded three or four times around the four fingers of the hand, and give the wire a loose turn around the cloth. If the armature is unprovided with centers these can easily be supplied. At intervals stop winding and hammer the partly completed coil flat by a block of wood and a light hammer. When the coil is completed twist the outer end two or three times around the next turn to prevent it from flying downward by centrifugal force—see Fig. 3. Next the whole coil is bound with thin, hard brass wire wound into the shallow groove turned in the armature poles for that purpose. Under this wire binding, next to the coil, is an insulating strip of mica A, Fig. 3, and a thin strip of copper—commutator copper is best—B is slipped under the binding wire and its ends doubled over to prevent the brass wire from spreading. The piece B and the wire binding are soldered at several points, and particular care is taken to solder the ends of the binding wire fast. When this has been done the final operation is to saturate the coil thoroughly with shellac, giving it all it will take, and baking it for several hours in an oven.

It is essential that the binding wires be drawn as tight as possible. This is best accomplished by replacing the armature shafts and centering them in a lathe, after which tension may be put on the binding wire as it is wound on by running it between two fibre blocks squeezed together in the tool post.

Strong Spark for Carbureter Adjustment.

When a new carbureter has been put on an engine it is sometimes difficult to get the mixture near enough right to start the engine, which is obviously the first step in obtaining correct adjustment. This may be particularly the case when ignition is by an old-style magneto, since these frequently do not generate a sufficient spark unless the motor is cranked quite smartly. If the ignition is by make-and-break it is easy to disconnect the

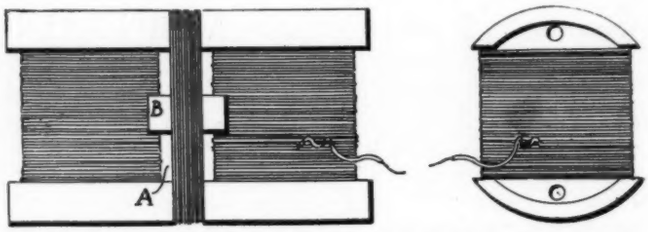


Fig. 3.—Showing method of fastening wire to prevent flying downward by centrifugal force.

magneto and substitute a battery and gas lighting coil. It is only necessary to disconnect the wire from the switch to the bus bar to which the ignitors are connected, and connect the battery wire in its place. Six or eight fresh dry cells and a coil will give a hot enough spark to ignite almost anything. The negative terminal of the battery is, of course, to be grounded. It does not take much running to exhaust the battery, therefore the magneto should be switched in as soon as the engine starts.

Possible Cause of Knocking.

Knocking, which occurs once per revolution or every other revolution in an engine whose bearings are known to be tight, may be traced to the magneto, or more probably to the coupling through which the magneto is driven. Knocking at this point can generally be felt by touching the magneto bearing and the bearing of the magneto driving gear. Occasionally it may be found that the driving end of the armature shaft is loose in the bronze disc which is screwed to the armature core. Such looseness may easily be remedied by rocking the shaft when it can be removed from the engine. Nothing is more jarring to the well-trained mechanical ear than a persistent noise emanating from the motor, and it is frequently the case that it is all out of proportion to the seriousness of its cause, which may be utterly trivial, though the result is such as to make the experienced driver fear that a disaster may be imminent. A loose accessory often causes suspicion to be cast on the motor.

THE LIMITATIONS OF THE UNIVERSAL JOINT

By H. VANDERBEEK.

ALTHOUGH the universal joint, originally known as Hooke's coupling, has been widely used for feed mechanisms on machine tools, for driving drill spindles, and in agricultural machinery, it was not generally employed for the transmission of considerable powers until the advent of the bevel-gear-driven-rear-axle automobile. Fundamentally, the universal joint is a device for the transmission of rotary motion between two shafts

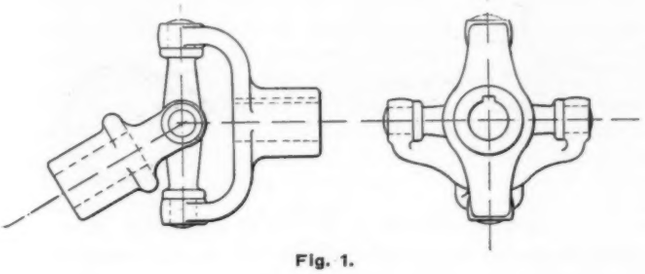
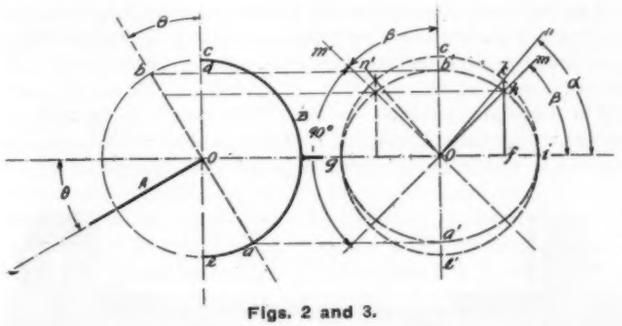


Fig. 1.

whose axes intersect in a point, with varying angles with each other; and although modified forms of the device are made which allow for lateral displacement of the axes, it is the purpose of the writer to analyze the operation, and determine the peculiarities and limitations of the universal joint in its true form; the modifications must necessarily be considered as individual cases, and are outside the scope of this article.

In its simple form, the universal joint consists of two shaft-ends terminating in forks and connected to each other by a cross member having two bearing axes at right angles to each other and which engage with corresponding journal bearings in the forks. This arrangement is shown in Fig. 1, and although joints



Figs. 2 and 3.

are made which differ in constructional details, the principles of this fundamental form apply in most cases. We will now proceed to the analysis of the movements of the several parts of the mechanism, when in operation, and for the sake of clearness, we will construct the diagrammatic view Fig 2, of the parts in the same position as in Fig. 1, and also the side projection Fig. 3.

Assuming that the joint has a position as shown in Fig. 1, where the fork B lies with its shaft axis and its cross axis both in the plane of the drawing and the fork A with its shaft axis in the plane of the drawing, and making an angle of θ with the axis of B, then the cross axis will have a position perpendicular to the plane of the drawing. It is evident that in rotation the extremities of the fork B will always move in the line c-e, Fig. 2, and in the circle c'-g-e'-i, Fig. 3, while the extremities of the fork A will describe the line b-a, Fig. 2, and the projection of this trace, in Fig. 3, will be the ellipse, i-b'-g-a'. Starting from the position, c'-e', as shown in Fig. 3, the fork B being at c' and e' and the fork A at i and g, we turn fork B through some angle β, then the trace of the point i, of the fork A will be along the ellipse and its location will be determined by the point of intersection of the ellipse and the line o-m, which is drawn at right angles to o-m', since the projection of the cross axes must always be at right angles to each other, because the axes are themselves perpendicular to each other and one of them lies in the plane of the projection, Fig. 3.

We have then determined the projection, in Fig. 3, of the cross axis of A in its new position, but since this line in its true position lies in the plane b-o-a, it is necessary, in order to determine its actual position, to swing the plane b-o-a into the plane of Fig. 3, and we then find that the point h travels to k, and that o-k is the true position of the cross axis of A in relation to its shaft axis, and that the member A has moved through an angle α, while the member B, has moved through an angle β.

It is now necessary to determine the dimensions of the angle α in terms of the angles β and θ.

From the properties of the ellipse we know,

$$fk : fh :: oi : ob'$$

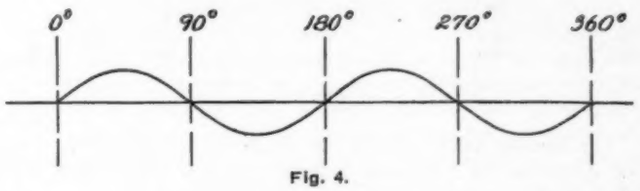


Fig. 4.

where oi is the semi-major axis and o-b' is the semi-minor axis, and from Fig. 3, we see that,

$$fk : fh :: \tan \alpha : \tan \beta$$

therefore,

$$\tan \alpha : \tan \beta :: oi : ob'$$

but,

$$oi = ob \text{ and } ob' = ob \cos \theta$$

therefore,

$$\tan \alpha : \tan \beta :: ob : ob \cos \theta$$

or,

$$\tan \alpha = \frac{\tan \beta}{\cos \theta}$$

which is the algebraic expression for the angle moved through by B, in terms of the inclination of the shaft axes and the angle moved through by A. It will be noted that when $\alpha = \theta$. $B = O$ and also that when $\alpha = 90$ degrees $\beta = 90$ degrees, or in other words, that four times in every revolution, the two forks stand

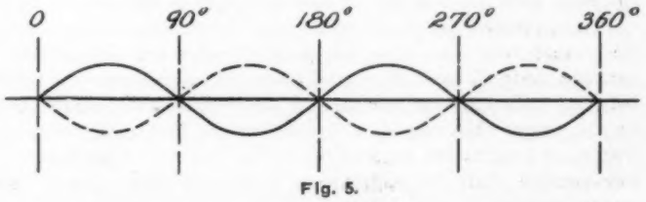


Fig. 5.

at 90 degrees with each other, and it is also evident that the maximum variation will occur midway between these positions.

Referring again to Fig. 3, and continuing the rotation of B for 90 degrees, we see that o-n of A will be at o-n' and is behind the member A an angular difference equal to the amount it was in advance in the former position, or in other words, its angular position is now negative while it was positive before. (The angular position must not here be confused with the angular velocity.) From what we have seen we may conclude that this

*Paper read at the Third Quarterly Meeting of the Society of Automobile Engineers, Cleveland, O., September 18-19, 1908.

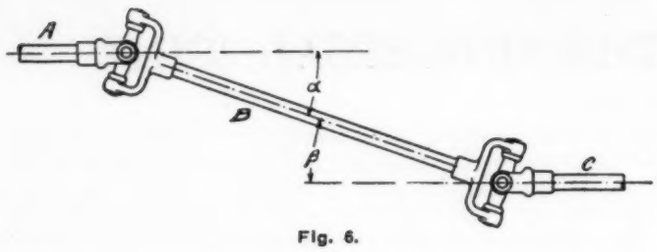


Fig. 6.

same angular relation is repeated in the two remaining quadrants of the cycle, and we may plot these relative positions; Fig. 4.

In practical application of the above, the maximum angular variation between the two members is probably of more interest than the angular velocity ratio, and in order to present this variation in concrete form, the following table will be of value.

Angle θ between shaft axes.	Maximum angular variation.	Length of arc, of circle of 3" diameter.
5°	6.57′	.00286 inches
10°	26.35′	.01149 "
15°	59.60′	.0260 "
20°	1°46.90′	.0466 "
25°	2°49′	.0737 "
30°	4° 7′	.1077 "
35°	5°41′	.148 "
40°	7°37′	.199 "
45°	9°35′	.251 "

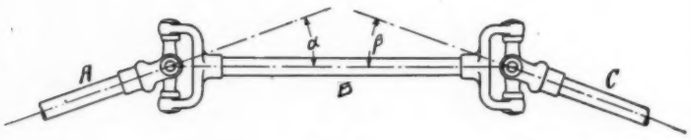


Fig. 7.

The angular variation and the length of the arc in the above are given as the numerical difference, which occurs both positively and negatively, twice in every revolution.

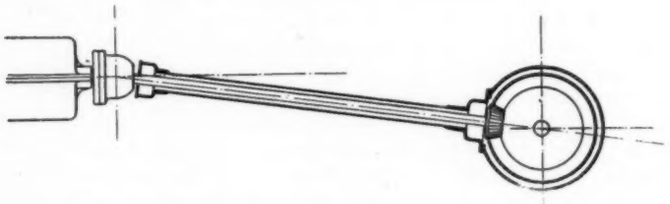


Fig. 8.

Recognizing this defect in the operation of a universal joint, it is customary, where smooth running between driver and driven parts is desired, to use them in pairs; the effect of this arrangement is to correct the variation of one joint by the complementary variation of the other. The graphical illustration of the effect of using joints in pairs, may be shown by referring to Fig. 4, and superimposing on this curve, that of another joint, in phase with the first but of opposite sign, as shown in Fig. 5.

The conditions, however, which must be met in order to give this result, are: That the fork axes of the stems of the intermediate shaft *B*, must lie in the same plane, and that the angle between both extreme shafts and the intermediate shaft shall be the same; this may be either as shown in Fig. 6, or as in Fig. 7, so long as the angle α equals the angle β. Evidently, the intermediate shaft, *B*, will have a varying angular velocity, but as this member is of small diameter and of light weight its non-

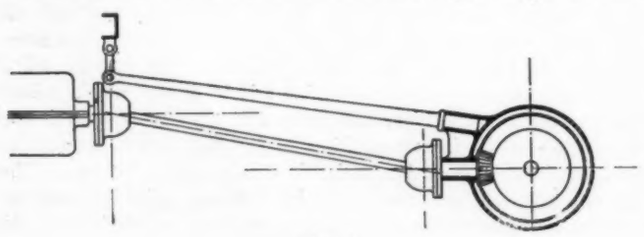


Fig. 9.

uniform motion will cause no trouble in ordinary cases. It must be borne in mind, however, that we deal here only with that condition in which the axes of the driving and driven shafts, *A* and *C*, lie in some common plane; an analysis of the case where these shafts lie in different planes is more complex and is beyond the scope of this article. In the application of the universal joint to the main drive of automobiles, designers have commonly chosen one of the arrangements shown; Figs. 8, 9, and 10.

The construction as shown in Fig. 8, includes only one universal joint, and the torsion resisting member is concentric with

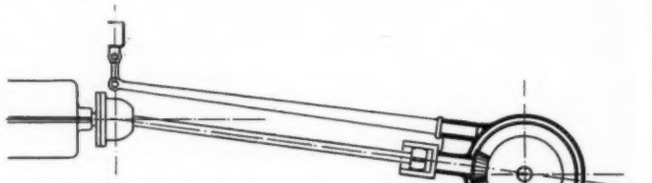


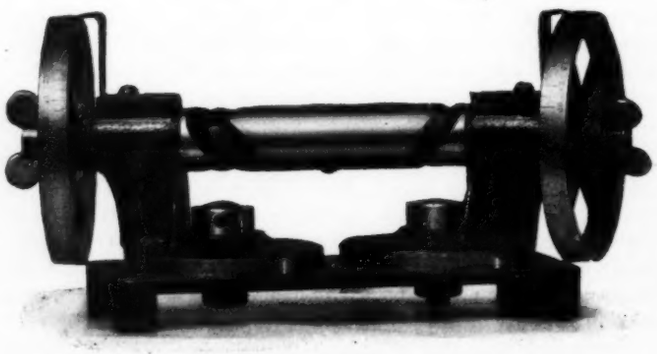
Fig. 10.

the extension of the pinion shaft. In Fig. 9, one universal joint is used at the forward end of the propeller shaft, and the connection with the pinion shaft is by means of a semi-universal or more properly, a flexible coupling, which is universal only to a small extent and its function is to allow for discrepancies in alignment and end motion and it normally works in practically a straight line. Fig. 10 shows the use of two full universals; the torsion member being independent, as is the case in Fig. 9.

It will be noted that in the construction, Fig. 8, the driving pinion will have the varying angular velocity of a single universal joint, and the amount will depend on the angle at which the joint operates. The effect of the arrangement Fig. 9 is the same as that of the arrangement Fig. 8, but in Fig. 10, it is possible by means of the double joint to eliminate the variation.

By referring to the table given above, we may note directly the approximate variation from normal, at the pitch line of the driving pinion, for conditions such as shown in Figs. 8 and 9; the amount given being calculated on the basis of a 3-inch pinion.

The foregoing calculations are not intended to discredit any one type of construction, but rather to indicate the laws which determine the practical limitations of this particular type of



Model Constructed by the Author to Prove His Theories.

mechanism. In conclusion, it may properly be said, that familiarity with the universal joint breeds respect, and although it seems to be called into service only as a last resort, the generous wearing surfaces, low rubbing speeds and smooth operation of a well designed universal must appeal as having mechanical virtues worthy of consideration. Given the same amount of time and thought in development which has been expended on the theory, design and manufacturing methods of bevel gears, it can easily be imagined that the universal joint would, in many cases, give a better performance than its accepted rivals.

PRACTICAL HINTS ON HANDLING A CAR

By ARTHUR H. DENISON.

IT would be hard to find two drivers who would handle a car alike. This is due to the experience the drivers have had, and their knowledge of the theory and principles of automobile driving and control. The owner of a new car will find that he cannot get as much out of it as the demonstrator for some little time, or till he is thoroughly accustomed to the car and knows how to handle it, whether traveling up hill or on the level.

Given suitable conditions, the gas engine will run indefinitely. A very slight fault will often cause an enormous amount of trouble, the symptoms of which may not be plain enough to enable the trouble to be located directly, and the whole system must be gone over sometimes before it is located. It is, therefore, necessary to know just what is happening under the bonnet, and just when some things should happen, that reasonable satisfaction may be derived from the car. There is no car that can be expected to be free from trouble, for even the best workmanship and material may give way sometimes.

Difficulties Met with in Starting Motor.

If a motor does not start on the first turn of the crank there is nothing radically wrong. On the first turn, or first piston passing over compression, the resistance due to compression may be felt, but the vapor compressed may not be a combustible mixture. It may be necessary to throw all four pistons over, and this will allow all four cylinders to be filled with a fresh charge of gas. The motor will then usually start on the next turn. While the modern carburetter is very sensitive, the height of the gasoline in the stand pipes, as controlled by the float, may be adjusted so low that the suction from the motor, when turned over by hand, is not sufficient to raise any gasoline, yet when running will work perfectly. There is, what may be termed, a critical adjustment to all types of carburetters and each has a corresponding throttle opening that has a great deal to do with the labor necessary to start the motor. This adjustment is not alike on any two carburetters and may range from a throttle opening of two or three notches to half or three-quarters on the control quadrant. If the throttle is open *too* much, and the motor being turned over by hand, the inlet valve is open for an appreciable length of time, and the piston is traveling at a very slow rate of speed in comparison to that when running. Under these conditions the rate of speed of the air currents flowing through the carburetter is so low that gasoline is not drawn from the spray nozzle, and though a certain amount of vapor is lifted by the column of air passing over the gasoline, the quantity is not sufficient to make a mixture that will ignite. On the other hand, if the throttle is not open enough the motor will choke itself, drawing too much gasoline. The suction is strong enough to draw the gasoline, probably in the form of fine drops, into the cylinder, where it is vaporized under the heat of compression and will either provide a mixture too rich to ignite or one that will burn so slowly that sufficient power is not developed to carry the motor over the following compression. Many motors will not run satisfactory till thoroughly warmed up and the warm-air inlet or hot-water jacket to the carburetter cannot furnish their necessary quota of heat until the motor has been running for some little time.

Handling of the Spark—Jump Spark Ignition.

The position of the spark lever when starting is important. If the car is provided with jump spark ignition, the system is usually arranged to permit starting on the spark. To allow this the full retard must be arranged so that the cylinder, whose piston is on its firing stroke, will allow ignition to take place with the piston half way down. Here the tension of the gas in the cylinder is very much less than that when on the dead center. If the motor has been standing and is cool, the tension of the gas falls to atmospheric pressure on account of the leakage and giving up of its heat. For this reason the term "starting on compression" is not correct. The motor will not retain a charge of gas at a pressure above that of the atmosphere for any length of time because of leakage through the piston rings, etc. To prove that it is not compression but merely the expansive action of the gas ignited at atmospheric pressure, which causes motor to start, the spark plugs may be taken out and replaced, and if the mixture remaining in the cylinder has the proper proportions of air and gasoline the motor will start when the spark is switched on. When the plug is out there would be an open passage from the compression space to the atmosphere, and according to the laws of air and gas, any pressure in the cylinder above that of the surrounding atmosphere would be immediately dissipated. This may be proved also by merely opening the petcock of the cylinder on compression. If the spark lever is fully retarded and the current switched on, igniting the gas, the resistance due to inertia must be overcome. The piston, already half way through its stroke, will only travel an inch or so further before the exhaust valve will open and the remaining energy developed by the charge will be directed out through the open port. Unless enough energy is stored in the flywheel to carry the motor over the following compression the motor will stop. This may happen whether an attempt is made to start on the spark or by turning it over with the starting crank. In either case one explosion may be heard and then the motor stops. This trouble is rather mysterious, but can be readily overcome by advancing the spark lever the distance of an inch to an inch and a half along the circumference of its quadrant, thus securing the initial impulse taking place just after the piston has commenced the power stroke. One quick jerk, throwing the piston over compression will do more good than five minutes' slow cranking. The manufacturer should set the starting crank so that the maximum compression should be felt when the crank is about 10 degrees past the horizontal. If the motor starts readily on the spark, and it will if the carbureter adjustment is such that the mixture is a trifle rich, the usual practice is to throw the control lever to full retard to secure the initial impulse and then advance it to normal running position.

Handling of the Spark—Make and Break.

A motor equipped with make-and-break ignition usually has the igniters set fully retarded, i. e., to fire a fraction of an inch past dead center. On a motor of this type a back-fire is very liable to occur if the spark lever is advanced only a few notches. In order to escape the serious consequences that may follow this (many arms and wrists have been broken) a good habit to cultivate is that of returning the spark advance and throttle levers to the proper position for cranking the motor before leaving the car, or immediately on stopping the motor. When on the road the best results are usually obtained by advancing the spark lever as far as possible without the motors pounding. With the make-and-brake system it is customary to advance the igniters to a fixed point and control the speed of the car with the throttle. Rules for handling the spark lever cannot be laid down, as conditions vary with the kinds of roads being traveled, difference in motors, etc., but a good driver will not allow the motors to pound.

One Frequent Cause of Inlet Valves Leaking.

A good feature on an American car is an adjustment that will allow the operator to throttle his motor to as low a speed as desired when the load is off. The connection is placed on the dash. The general practice among drivers, when wishing to keep the motors running slowly, is to retard both spark and throttle levers as much as possible, the adjustments being usually set to allow the motors to just keep running under these conditions. This practice is responsible for the need of grinding in valves at short intervals. With the spark lever retarded, the gas is ignited so late in the stroke that the exhaust valve opens before the

charge is burnt, consequently the gas at a very high temperature is passing between the valve and its seat, heating both to an unnecessary extent. The cool gas, coming in on the suction stroke, will help the water-cooling system to keep the valve cool, but even with this help it will not withstand the heat very long and is soon warped, allowing leakage during the compression stroke. The remedy is to adjust the throttle so that the motor may be run as slow as desired with the spark advanced so that ignition is taking place nearer dead center.

Proper Care and Operation of Clutch.

Successful operation of the clutch cannot be expected unless the clutch, the pedal connections and universal joints between the clutch and gear box are cared for. Clutches employing leather as one of the friction surfaces, such as the cone and expanding types, need pretty regular attention. To insure the best results the leather should be kept soft and pliable as a razor strop. The multiple-disc clutch usually runs in oil and gives little trouble. As the oil has to be squeezed out before the clutch can take hold, this type of clutch is easier on the car and less liable to be injured by careless handling. It is by no means rare to see the rear wheels of a car jump off the ground when a "fierce" clutch takes hold. This racks the car a great deal, and is very destructive on tires. Castor oil or neatsfoot oil make an excellent dressing for clutch leathers.

Handling of Gears Sure Test of Driver's Ability.

Skillful handling of the gear-shifting lever on a sliding-gear system can only be obtained by practice. One of the best tests of a driver's skill is to notice the way he handles his gears. A skillful man, accustomed to a car, will pass through all speeds, either up or down, noiselessly, unless for the click caused by the lever bringing up against the quadrant. There are two systems in general use, and they are termed the Progressive and Selective. In the progressive, the different gears are meshed by a lever working in a single path, either forward or backward. In general practice it is arranged with three speeds forward and reverse, occasionally four speeds forward. It was brought out by the Panhard Company, who still use it.

The Selective system originated with the Mercedes Company and has many advantages over the Progressive. The name—Selective—indicates that the neutral position of the lever is so arranged that any gear combination may be engaged, and the lever may pass from any gear directly to neutral without passing through any other gear, something impossible with the Progressive system.

With the Progressive gear the system is usually arranged so that reverse is in mesh with the lever at the extreme rear and high speed at the forward end of the quadrant, the intermediate speeds proportioned in between. The lever usually has a button on top, controlling a latch that locks it in place at any desired speed by fitting into a slot cut in the quadrant. The easiest method of securing the proper amount of travel, from one speed to another, is the following: Press the button or finger clasp that releases the latch from its slot, and while holding it released move the lever far enough to prevent its slipping back into the slot when the button is released. The latch will now be pressing against the quadrant bar, and the lever can be moved until the desired gear is properly meshed, where the influence of the spring will pull the latch into the slot and lock the lever. If the latch is held released the result may be that the lever be carried too far into the following neutral. If this occurs the best thing to do is to stop and come back to first speed again.

The Progressive gear, as worked out by the Packard Company, does not have a locking device on the lever, the same result being obtained by a device in the gear box. When shifting from first to second, or from third back to second, the lever should be carried rapidly forward or backward until the gears are felt to engage. The locking device, though not automatic, will check the travel of the lever, and if the gears are properly in mesh will provide sufficient resistance to the movement of the lever to assure the operator that the gears are correctly in mesh.

Drivers handling the Selective system have two things to remember. The first is to keep it well oiled that the lever may slide freely sideways. The second is to keep their hands off the button unless it is desired to enter reverse. The lever works in an H slot, the cross bar of which represents the neutral path. Reverse is reached by providing a third path outside, and to prevent the lever entering it accidentally a projection is cast on the plate. The lever is provided with a latch, controlled by the usual button on top, and when the button is pressed the latch is thrown to clear this projection. The lever will then pass freely to engage with the reverse shifting rod. To mesh the gear it is moved backward or forward in the usual way.

Some cars have appeared on the market with the speeds arranged like this R 2 4. If on a hill and conditions demand a
1 3
change to a lower gear, say, third back to second, if the driver handles the lever without touching the button, he will have no trouble. If he does, he is almost sure to enter reverse, with possibly serious consequences.

The clutch should be thrown as far forward as possible before any attempt is made to engage the gears. (Some cars have appeared with only one pedal so arranged that the clutch was first released and further travel of the pedal applied the running brakes.) The different types of clutches in use and the care bestowed on them has much to do with the ease with which the gears may be engaged. The cone clutch, with its comparatively large diameter, is likely to spin longer than the multiple disc. Any attempt to mesh the gears while the clutch is spinning will result in the gears growling, possibly chipping the teeth. Few types of clutch can be depended on to stop spinning as soon as the clutch pedal is pressed, and it is advisable to wait a moment or two before attempting to engage the gears. Occasionally the shaft will stop so that the teeth of one gear will strike the teeth of the other and prevent them meshing. When this occurs engage the clutch again for an instant, thus letting the clutch shaft spin, and after giving them time to stop spinning try to mesh the gears again. After the car has started and it is desired to shift from first to second, etc., speed the engine for a moment, close the throttle, then release the clutch and shift the gears. If the engine has not reached too high a speed this will allow the gears to engage quietly.

Never attempt to force the gears into mesh. If they will not engage without being forced, there is something wrong and jamming down hard on the lever is only liable to aggravate the trouble or spring the shifting arm or lever. The noise or growl so frequently heard is caused by the attempt to force the gears together while they are traveling at different rates of speed. This serves to grind and chip the edges, occasionally breaking the teeth. Judging from the condition of the gears from the majority of cars in the repair shop, the only conclusion is that the average driver seldom waits long enough before attempting to engage first speed. In some instances careless handling has resulted in allowing the clutch to take hold when only half the teeth were in mesh and the teeth were half ground away.

Handling a Car on the Road.

Very little can be said about handling the car on the road. The operator must handle each separate case as he meets it. New York has policemen whose sole duty is to regulate traffic. On a country road the farmer will either give the motorist the whole road or won't move until he has to. He isn't a bit particular whether he turns to the right or left. Similarly when following and trying to overtake another automobile on the road, the driver of the leading machine may try to prevent the other car from passing him, or may take that side of the road that looks best to him regardless of rules or laws. When passing little breaks in the road caused by water running off and carrying the road material with it, holes in pavement, etc., the shock of striking the edges is rather severe on tires and may be lessened by releasing the clutch for the moment and allowing the car to coast, always taking "waterbreaks" and similar rough spots straight on, so as not to strain the car unnecessarily.

LETTERS INTERESTING AND INSTRUCTIVE

HIGH AND LOW TENSION MAGNETOS.

Editor THE AUTOMOBILE:

[1,574.]—Will you kindly explain through "Letters Interesting and Instructive" the difference between high and low tension magnetos? I mean the difference in working parts and the systems with which they are used. I think a great many people would be interested in an explanation of this, because, for some reason or other, literature on this subject seems very scarce and uninforming. I have been told that low tension magnetos can only be used with make-and-break ignition. Is this correct?

Ludington, Mich. M. E. CARTIER.

There is considerable vagueness and inaccuracy, at least from a strictly electrical standpoint, in the description of automobile magnetos, and this is no doubt responsible for much of the popular confusion. The simplest form of magneto is the low-tension, which consists of a number of permanent horseshoe magnets and an armature rotating between their poles. As the armature cuts the "lines of force" of the magnets an electrical current is set up in its coils, and this is collected by a suitable brush. In this form the magneto is generally used with make-and-break ignition, but it could be used with jump-spark also, in connection with a timer and spark-coils, or a timer, single coil and high-tension distributor. As a rule, however, when this type is used with jump-spark, the timer and distributor are mounted on the magneto, and it is then usually called a "high-tension" magneto. As mentioned above, this name is electrically incorrect, for the magneto generates only a low-tension current, which is then transformed by a separate spark-coil. About half of the so-called "high-tension" magnetos on the market are of this type.

A true high-tension magneto, on the other hand, has a second winding on its armature which takes the place of the spark-coil, so that its current when collected for distribution is already high-tension. There is little difference in the external appearance of the two types, and the only sure way for the layman to distinguish between them is to look for the separate spark-coil.

QUESTIONS ON IGNITION SYSTEMS.

Editor THE AUTOMOBILE:

[1,575.]—In your "Letters Interesting and Instructive" will you please give me the following information:

1. What is the best voltage for ignition with the make and break system (low voltage interchangeable with dry cells)?
2. Can a make and break system be used without an induction coil?
3. Is it practicable to use an Apple dynamo on a make and break system without the coil, and if not, why?
4. What is the advantage of using water with the gasoline mixture?
5. Can water be utilized to the same advantage with alcohol?
6. In testing dry cells to get at the comparative life of different makes of batteries, how long should they operate constantly on a coil requiring one ampere (not on a machine)?

Manila, P. I. F. H. THOMPSON.

1. The low-tension magnetos used for this purpose usually generate about 100 volts at their maximum speed; with dry cells an induction coil must be used.

2. With a magneto, yes; but with dry cells the coil is necessary. The coil used need not be as powerful as the regular jump spark coil. Most manufacturers of electrical goods have a special type for make-and-break ignition.

3. No, because the Apple dynamo has only about the same voltage as a set of dry cells.

4. There is no advantage we know of; in fact, a little water in the gasoline will usually stop the motor entirely.

5. A small amount of water in alcohol makes no difference.

6. The cells should last as many hours on a one-ampere coil as the number of ampere-hours of their rating, which depends on their size. It is not fair to the batteries, however, to run them constantly, as they give much better results when used only intermittently, as for ignition on a gasoline engine.

LARGE WHEELS AND LONG WHEELBASE.

Editor THE AUTOMOBILE:

[1,576.]—I have a suggestion to make with reference to tires for the "ideal car." I have owned two machines already and know how tired one gets of punctured tires. We must use pneumatic tires on wheels between 30 and 40 inches in diameter on American roads. But would not solid tires on 50-inch wheels give as smooth running as pneumatic tires on 36-inch wheels? I believe they would. A larger wheelbase would also help the riding qualities. Wheels and frames would both have to be stronger and frames would have to be dropped in order to retain the same center of gravity for the entire car. But I believe that the advantages of 50-inch solid tires and 160 inches wheelbase for seven-passenger cars and 44-inch solid tires and 136 inches wheelbase for runabouts (high-power cars only being considered) would far exceed the disadvantages.

La Fayette, Ind. A. L. SHERIDAN.

There can be no doubt that the sizes of tires and wheelbase which you suggest would give sufficiently easy riding, but the key to the situation is in the last sentence. Would the advantages exceed the disadvantages? Most manufacturers seem to think that they would not. The weight of the car would be enormously increased, and the steering would be very awkward, requiring a 10-acre lot to turn around in. The larger the wheels, the smaller is the maximum angle through which they can be turned for steering, without striking the frame; and the longer the wheelbase, the greater is the steering angle required for turning in a given radius. Thus you are increasing your difficulties in two ways at once.

AN IDEAL CAR OF IMPOSING DIMENSIONS.

Editor THE AUTOMOBILE:

[1,577.]—Under your very expressively and accurately named heading, "Letters Interesting and Instructive," will you kindly furnish the following information?

1. For a man who does not want to go shopping, marketing or on exhibition through city streets, but who wants to get out in the country close to Nature and divide this luxurious experience with his family and a few friends, and yet who has to go over roads (not pikes), is not a 60-horsepower, 7-passenger, 168-inch wheelbase, 60-inch tread the ideal car?
2. With the above wheelbase and tread would not a car having 44-inch wheels be as free from skidding as present sizes?
3. Are not the majority of bodies for seven passengers too short for comfortable riding for more than an hour or two?
4. If spark is advanced until the mixture is fired before the crankshaft has passed dead center does it have any appreciable effect on heating the cylinders? LEARNER.

Birmingham, Ala.

1. Your "ideal" is entirely too large for any practical use; on the roads you speak of you would find it about as manageable as a small locomotive. Half the power and two-thirds the wheelbase would serve you much better.

2. The only way to find out would be to build such a car and make experiments.

3. Not necessarily; they are usually very well designed.

4. No, advancing the spark prevents heating, owing to the rapid firing and exhaust of the charge, while retarding the spark causes the motor to heat, but there is a limit to the advance.

OVERCOMING THE CARBURETER "POPPING."

Editor THE AUTOMOBILE:

[1,578.]—I own a Mitchell (1908) touring car on which is a Holley carbureter. This carbureter has worked perfectly until a month or so ago, when on cranking the engine it would "pop" several times before settling down to work. It has been getting worse and worse until now it is all I can do to start the engine. It will "pop" maybe for fifteen minutes before I can go; after that it goes as well as it ever did. After the motor has stopped sometimes only fifteen or twenty minutes, it is very hard to start it again, no matter how hot the cylinders are or how warm the day. I have taken the carbureter all apart, but can find no dirt or anything in it, or no parts worn or broken. I know it is adjusted right, although now I cannot start on the spark immediately after stopping the engine. The valves are in good condition, too. I know the gasoline to be all right, and the pipes leading to the carbureter to be clear.

If you could suggest anything to overcome the trouble, I would be very greatly obliged. W. N. HUTCHINGS.

Moosic, Pa.

You do not state whether the Holley carbureter you have on your machine is of the new Venturi tube type, more familiarly known as the "puddle" type, or of the spray nozzle variety, although, as a matter of fact, "popping" usually proceeds from a similar cause regardless of the type of carbureter. It is set up by the fact that the mixture is either too rich or too weak and on that account continues to burn, not only throughout the length of the stroke, but after the exhaust valve has closed. This maintains considerable excess pressure in the cylinder, which naturally escapes through the inlet valve the moment the latter opens; it is the release of this pressure through the inlet valve that constitutes what is familiarly known as "carbureter popping," and it can usually be remedied by making the proper air and fuel adjustments at the carbureter.

The fact that in your case it occurred at first only at starting was an indication that the carbureter adjustment was more nearly correct for the engine requirements at the higher speeds, and as soon as the motor speeded up a bit, it ceased. We very much fear that your "I know it is adjusted right" may not be entirely based upon fact, and if you will overcome this fault you will probably find that there is nothing else the matter. If you will carefully read H. L. Towle's "Getting Acquainted with a Carbureter," which appeared in THE AUTOMOBILE of September 24, we think you will find a great many more pointers than could well be put in a reply to your letter in these columns.

ADVANTAGES OF A FIXED POINT OF IGNITION.

Editor THE AUTOMOBILE:

[1,579.]—Will you kindly describe in "Letters Interesting and Instructive" the advantages and disadvantages of a fixed point of firing for machines depending upon a magneto for ignition.

Alameda, Cal. HENRY M. POND, M.D.

To begin at the tail end, we do not know of any particular disadvantages arising from the use of a fixed point of firing the charge where both the magneto and the rest of the system have been properly designed. Of 30 representative French motors, probably 40 per cent. were found to be equipped in this manner. On the other hand, its advantages are that the motor is always run with a uniform firing point, which should not only tend to increase its average efficiency, but also to lengthen its life. As the magneto is not subject to the various factors of "lag" that are present in the coil and battery system, there is not the same necessity for providing a wide range of advance. It is customary to provide means for retarding the magneto for starting, but as the latter does not generate as efficiently at the lower speed of cranking, as it does with the motor running, this is but slight. The magneto's voltage increases with its speed and, in consequence, it automatically takes care of the slight amount of extra advance required over that at which it is set. Practice is tending slowly in this direction and doubtless the fixed point of ignition will, sooner or later, become general.

SEASON FOR NON-FREEZING SOLUTIONS OPENS.

Editor THE AUTOMOBILE:

[1,580.]—Will you kindly advise me how low a degree of temperature a solution of one-half alcohol and one-half water, put in my radiator, will stand before freezing. Will you also advise me if wood alcohol will serve as well as grain alcohol in this case. Is there anything better that I could use for this purpose?

Ansonia, Conn. LUCIUS B. TERRELL.

A 25 per cent. solution of alcohol and water will resist freezing down to zero Fehrenheit, so that a 50 per cent. solution such as you mention would doubtless be capable of resisting any temperatures prevailing here in the East. Wood alcohol will serve as well as grain alcohol, but neither carries with it a very strong recommendation for the purpose, owing to the instability of the solution, i. e., its constant loss by evaporation, and as the alcohol boils at a much lower temperature than the water, the former will pass off much more rapidly, constantly decreasing the ability of the solution as a whole to withstand freezing. The wood alcohol also attacks the rubber hose connections. A better non-freezing solution may be obtained by using calcium chloride; a 25 per cent. solution will withstand a zero temperature, and below that will only become mushy and not freeze solid enough to do any damage, unless the cold were of a severity seldom known in this part of the country. Increasing the proportions will naturally increase its non-freezing properties.

ON THE SPARE-WHEEL BALL-BEARING QUESTION.

Editor THE AUTOMOBILE:

[1,581.]—In relation to the criticism by Henry Hess, published in "The Automobile" of September 17, page 401, involving the use of a spare wheel (in an emergency) as advocated and sold by the Spare Motor Wheel Company of America, Ltd. (Stepney Spare Wheel), I desire to say, the placing of the extra wheel outside of the regular wheel and fastened thereto, but utilizing the regular wheel hub (and, as a consequence, the ball-bearings in the regular hub), must, as Mr. Hess states, transfer the plane of the load. Thus is one bearing relieved of some of its burden, and if it is weak, it must accordingly congratulate itself, as it were. But if Peter is thus deprived of his burden, Paul must tote it for a while. If Peter is so weak as to rejoice at the loss of the burden, Paul must also be a little off of the top as well, since Peter and Paul are both in the same boat. (Two bearings in one wheel hub.)

There was a time in the history of ball bearings when their life was short, even with no great load. Time wrought changes, and in time a factor of safety crept into the zone, now dominated by ball bearings. This factor of safety is claimed to be very large when purchases of ball bearings are made, and experience has proven that the goods are generally delivered on a basis far more reliable than can be claimed for the delivery of coal.

Builders of cars have great respect for the advice of the maker of ball bearings, which respect is shown in a most satisfactory way, in that the bearings are (I might say) invariably larger than the makers of ball bearings are wont to recommend.

Under the circumstances, then, it does seem as if the Stepney spare wheel, or any other device of the kind, will scarcely disturb the obvious serenity of the ball bearings in the wheel hub.

No man would be justified in riding in an automobile if he was skating on the thin ice portrayed in the condition that is represented by the possible failure of the ball bearings in the wheel hubs, merely because the plane of the load has been transferred a distance equal to the section diameter of a tire.

As Mr. Hess says, limit the time of the use of the spare wheel to the time during which it serves its obvious purpose, but who would want to keep the spare wheel on any longer? On the other hand, the spare wheel will not level the road inequalities, and these inequalities certainly stress ball bearings more than any spare wheel possibly can.

It is perfectly reasonable to assume that an autoist who has to apply the spare wheel will be a little more careful over considerable road inequalities than he would ordinarily be, and this difference will surely amount to more than that resultant of the small transfer of the plan of the plane of the load, due to the use of a spare wheel.

Automobilists who are not sharps, when it comes to mechanical hair splitting, might think that ball bearings are weaklings, so easily disrupted that the mere application of a spare wheel would do the trick. Were they to reach such a point in a scheme of reasoning, more inertia would impel them further, and they would (according to the law of probabilities) reach the final conclusion that a mile a minute in a car fitted with wheels that would surely come off if the ball bearings were to go to pieces is too near heaven. THOMAS J. FAY.

Brooklyn, N. Y.

ABOUT DELAGE'S "MONO" IN THE GRAND PRIX.

Editor THE AUTOMOBILE:

[1,582.]—I notice in Mr. Ricker's letter in your last issue—September 24—a slight error regarding the Delage Voiturette, winner of the Dieppe race of last July, which I should like to correct. All of the Delage cars were single cylinder 100 m.m. bore by 160 m.m. stroke. Guyot's motor was designed by Delage and built at the De Dion works, and the other motors were De Dions specially built for the race. Guyot's motor was one of the most beautifully balanced ones that I have ever seen. Of course I am referring to "one lungers" only, or "mono's," as we call them over there. When the motor was cranked, the chassis would vibrate vertically; there was no side rocking as in the other cars. Aside from the motors, the cars were made up entirely of stock parts. Delage is a friend of mine, and I was with him at Londinieres.

New York City. SANFORD POMEROY.

HOW TO ATTACK THE ROADS' DUST PROBLEM

WASHINGTON, D. C., Oct. 5.—Excerpts from a report on dust preventives prepared for the Department of Agriculture by Prevost Hubbard, assistant chemist in the Office of Public Roads, and just issued for general distribution, are of more than passing interest to automobilists. The report says:

"The suppression of dust on roads is a problem which has become prominent only within recent years, but its importance is rapidly increasing, as it involves the saving of much money and the comfort and convenience of the public at large, as well as of road users. In arriving at a complete understanding of a subject of this kind it is essential that as broad a view of it as possible be obtained, and, in order to achieve this result, one must look at the matter from at least three different standpoints—that of the engineer, the chemist, and the layman. The direct solution of the problem depends to a great extent, of course, upon the efforts of the road engineer, but the aid of the chemist and road user will eventually prove to be important factors which cannot be overlooked. The subject is one which also deserves the attention of the general public, as it has a very direct bearing upon matters which are of universal interest.

A Moon Among the Colorado Mountains.
Fred C. Merry and family of Kansas City, Mo., who toured from Kansas City to Denver in their Moon automobile. The picture is interesting as showing the kind of country tourists can traverse nowadays.

"In considering the cause, or rather the causes, of dust formation a few general remarks may not be out of place. The term 'wear,' when applied to solid substances, undoubtedly expresses the fundamental cause of such formation, although other factors which make wear possible and which tend to remove and distribute the dust formed play important parts. All forces which tend to disintegrate or destroy will of necessity produce wear, and these forces, when considered in connection with roads, may be conveniently classed under three heads—chemical, physical and mechanical.

"The automobile is, perhaps, the most potent factor which at the present time operates to produce dust and destroy roads. When moving at a high rate of speed its broad rubber tires exert a pulling or lifting effect upon all loose material on the road surface and a cloud of dust is sucked up and carried along behind each vehicle. The slightest current of air then carries the dust cloud over the surrounding country. The enormous increase in the last few years of fast motor traffic along public highways has aroused general interest in the subject of dust prevention.

"The coincidence of the appearance of the automobile with the aroused interest in the dust nuisance has led to the impression that the former is the sole cause of the trouble. It will be remembered, however, that the dust nuisance on a somewhat smaller scale existed long before the coming of the motor car. If the automobile has resulted in an awakened interest in this problem, it will have served a valuable purpose, but besides this it has undoubtedly exerted a beneficial influence in arousing the public at large to the knowledge that good roads are necessary to the country's welfare.

"The dust problem as it stands to-day seems to be open to two methods of attack: (1) by applying materials to the road which will hold down the dust formed, or (2) by methods of construction designed to reduce the formation of dust, and therefore the wear of the road, to a minimum. Dust prevention has so far been mainly confined to the treatment of old macadam.

24 COUNTRIES SEND DELEGATES TO ROAD CONGRESS

PARIS, Oct. 4.—Twenty-four countries, including the United States, Brazil, Mexico, Chile, India and Japan, will be officially represented at the first International Road Congress, which opens its official sessions at the Tuilleries October 12. The scope of the work of the congress is very bread and great good is expected from the exchange of opinions which will take place. A glance at the numerous papers which will be read before the congress and which will have already been translated so that their contents may be available for all, emphasizes how far America is behind in the matter of roads, compared with Europe.

This is not, of course, to be wondered at considering that every country in Europe, even the most backward, has for centuries possessed the foundations of magnificent roads built for military purposes. Nevertheless, it is starting to read, for instance, that of the 2,151,570 miles of public road in the United States only 7.14 per cent., or 153,662 miles, are improved. The mileage of improved roads in the United States, therefore, is only equal to the mileage of the magnificent French National and departmental roads, which average between 24 and 25 feet in width.

A large proportion of the work of the congress is to be devoted to the consideration of the effect upon roads of new means of transport, especially automobiles, and an attempt will be made to approximate the best method of constructing the ideal road of the future. The papers of the experts agree that the essential feature of a good road is a hard core, preferably of armored concrete making an unyielding incompressible foundation with the material perfectly bound together, and the surface properly metaled and tarred to prevent dust or mud. Methods and materials suggested vary greatly, but all agree that tar up to the present time has proved most efficacious against water and the prevention of dust.

The general American delegates are L. W. Page, director of the Public Roads Bureau of the Agricultural Department; Clifford Richardson, of New York, and Col. Charles S. Bromwell, superintendent of Public Buildings and Grounds of the District of Columbia. In addition, Massachusetts sends Harold Parker,

chairman of the Highway Commission, and A. B. Fletcher; Mississippi has named Charles Scott. Bishop Galloway and Representative John Sharp Williams; Washington, Samuel Hill, and New Mexico, Numa Reymond.

NOTABLE EXPERIMENTS IN ROADMAKING.

The problem of building durable and at the same time dustless roads has become such a momentous one that men all over the country are bending their efforts towards a speedy and successful solution. The State roads, as at present constructed, have not only proved to be unsuited to the constantly increasing travel, but they are an enormous expense. With this question of expense in view, the men who are spending the most time on the problem, are working not only to find a combination of materials which will withstand any reasonable demands being made of it, but they are after a combination which will cost less.

For the last few years the scientists in the office of the public roads of the United States Department of Agriculture have been working along these lines. So far they have spent most of their time in the attempt to make use of the enormous quantity of slag which is to be found near all blast furnaces. The slag is being used to take the place of the broken stone, and combinations have been made up with both tar and asphalt. One stretch of experimental road is being constructed out of the slag asphalt combination near Chicago, under the supervision of Chief Engineer Pierce, of the Federal Bureau. Another stretch made out of the slag-tar combination is under way at Birmingham, Ala., under the direction of Assistant Engineer Heidel. These stretches will be watched with interest during the next year to see how this new class of road is going to stand the wear.

A more novel experiment is being tried near Newton, Mass., with an entirely different substance—molasses—which is almost a useless by-product of the great sugar refineries in the South and West. A half-mile stretch is being prepared where the molasses is going to be tried as a binder.

MAINE'S ADVANCE IN ROAD BUILDING.

PORTLAND, ME., Oct. 5.—On every hand there is evidence that a great advance has been made this year in plans for the construction of State roads. The many meetings held throughout Maine by State Highway Commissioner Paul D. Sargent have borne fruit, with the result that many towns have already commenced the construction of better roads, taking advantage of the opportunity to secure money from the State, or are about to begin work.

One of the longest pieces of State road being constructed in Maine this season is in the town of Rumford Falls, where about 2 1-4 miles of road is nearly finished. The road in question is being constructed of macadam, with a width of 15 feet, and a special feature in connection with the work is the construction of about 3,000 feet of side sub-drain, as the road lies mostly on the side of a hill from which a large amount of subsoil water has in the past found its way into the road. The work also includes the construction of 22 culverts.

Announcement is made by Commissioner Sargent that there are 16 cities and towns in the State in which State road work has been advertised and work begun or nearly begun. These places are: Brunswick, South Berwick, Houlton, Ellsworth, Caribou, Eden, Gardiner, Madison, Fort Fairfield, Westbrook, Presque Isle, York, Rumford, Kennebunk, Sanford and Portland.

In discussing the work with a representative of THE AUTOMOBILE, Commissioner Sargent said:

"It is the aim of this department to have one good highway across the State. With that end in view, the sections of the road constructed each year are so laid out that they will join previous sections. In this way, as each town constructs a section of road, the aim of having a good highway for automobiles and all vehicles right across the State from Kittery to Calais is being gradually realized and it will be but a few years before this is completed."

SOME DANGER POINTS IN AUTOMOBILE USE

By A. D. HARD, M. D.

SOMETIMES a very small matter leads to results of great importance. A steering gear that is not sensitive to the touch, or one that from lack of lubrication has become sticky and does not so easily respond to the force usually applied by the accustomed driver, will so hamper the control of the car that, when skidding occurs in sand or wet, the car may go over an embankment or into a ditch. The writer has investigated this matter and found that three fatal accidents which he had the opportunity to carefully examine, were due alone to this cause. When a steering gear is composed of a worm gear sliding a large nut up and down to convey motion to the steering arm, there is great danger of the nut becoming dry and working with much greater resistance to the hand on the wheel than it should. It is an objectionable form of steering mechanism for this reason.

Another source of danger in the steering mechanism is the slack which is so common in some cars, even when recently out of the factory. Some engineers claim that this is a good feature instead of a bad one, but I think that any experienced driver will agree with me in saying that there should be but very little slack in the motion of the steering wheel. An instantaneous response to the guiding touch is the feature we want, to guard against undue deviations when the car is going at high speed. The actual time required to deviate enough to run off a grade, or into a ditch, or into an obstruction near the roadway, is so very small that none should be wasted in turning the steering wheel to take up slack. In my opinion as an experienced driver, the steering gear mechanism of the modern car has not had as much careful attention as it deserves.

As we all know, skidding is a source of much danger to both car and occupants, as well as to other vehicles that the car may be passing. The cause of skidding is found in the action of the differential. When one wheel slips the other drive wheel loses its guiding and propelling force, and the car is deviated from side to side by the uneven traction of the wheels. Racing car drivers have found that with no differential they are much surer of their footing in bursts of speed. If we could have a differential mechanism, which only acted when the front wheel were deviated a certain distance from straightaway, and the driving axle acted as a unit under other conditions, we should have all the advantages of a differential when it was needed, and the advantages of its absence when it was not needed. Another suggestion is to have a means of locking the differential at will. Another suggestion is to employ adjustable friction disc clutches between each drive wheel and the driving axle, with an automatic release for the inside wheel when turning corners.

Guarding Against Crossing Accidents.

The large number of fatal accidents due to crossing railway tracks at the wrong time has suggested all kinds of remedies. The warning noises of an approaching train are so similar to the usual noise of the automobile that they cannot be depended upon for the safety which the horse-drawn vehicle may have, and the speed of approach is so much greater that the car driver is further handicapped. There is one way which seems both safe and simple. The car should be driven up to within a few feet of the track and stopped, then prospects of danger can be hardly overlooked, and the car can proceed across the track or wait for the train to pass before doing so. In some parts of the country the signs at railroad crossings read: "STOP—LOOK—LISTEN." No better warning can be devised for automobilists in crossing railroad tracks. The Irishman was right when he said: "Niver cross before a train, before the train has passed."

NEW W. & S. MAGNETO OF THE INDUCTOR TYPE

IN addition to their line of carbureters, Wheeler & Schebler, Indianapolis, will market for next year an inductor type of low-tension alternating-current magneto which takes the place of a storage cell in the ignition system of a car. The magneto is friction driven from the flywheel or belt driven from any

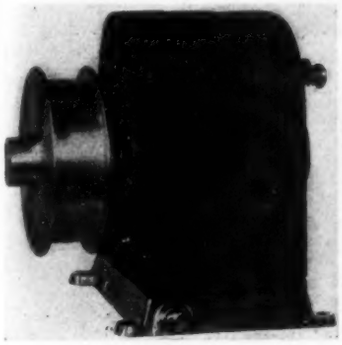


Fig. 1.—W. & S. Inductor Magneto.

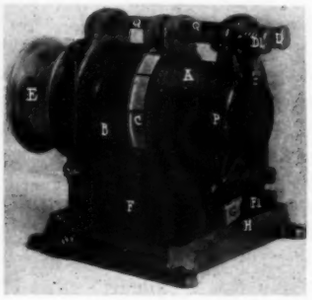


Fig. 2.—Minus the Field Magnets.

other part of the car and is made to rotate three or four times as fast as the motor crankshaft, giving a current of 5 amperes at 12 volts. For car work this inductor magneto can be used in connection with a set of dry cells, the same four-unit coil and timer being used for each and one set of plugs sufficing. Producing as it does an alternating current, it cannot be used for charging storage cells, but simply takes their place on a car.

Fig. 1 is the magneto complete with three permanent horseshoe magnets, although a double set of three is employed in all of the latest ones manufactured. At the end appears the aluminum belt pulley. In Fig. 2 the magnets and a brass case between them are removed, exposing every part of the apparatus, consisting of a rotating shaft carrying a three-pointed inductor *A* and another *B* with a coarsely wound coil *C* of flat copper ribbon between them. The ends of the copper ribbon connect directly with the binding posts *D* and *D1*, which completes the magneto. The winding *C* is stationary and nothing revolves but the two inductors *A* and *B*, which are pinned to the shaft which carries the friction wheel *E*, and which shaft revolves on a pair of F. &

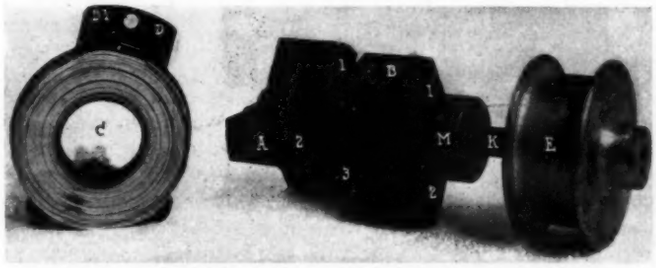


Fig. 3.—The Strip Copper Winding and the Inductors.

S. ball bearings, one appearing in Fig. 5 at *M1*, carried in the end piece *P* of the magneto. In Fig. 4 appears an end view of the magneto, showing in detail one of the star-shaped inductors with its three arms 1, 2 and 3, regularly spaced at 120 degrees, and each arm consisting of twenty-seven laminations of high-frequency transformer iron pressed together and secured by soft iron rivets. The arms of the other inductor *A* (Fig. 3) are alternated with those of inductor *B*, and in this illustration is shown the copper ribbon winding *C* with the ribbon terminals at *D* and *D1*. The copper winding is given a white effect because of the layers of paper for insulation between the copper. The coil has seventy-two turns. In Fig. 4 *F* and *F1* are the pole pieces against which the ends of the magnets bear, and *G* is a separator of aluminum between them.

The generation of current in an inductor magneto of this type is briefly as follows: In Fig. 6 appears a diagram of an end view with *A1*, *A2* and *A3* representing the arms of one inductor and *B1*, *B2* and *B3* of the other, the coil *C* as before being the copper ribbon. When arm *A1* is in contact with the pole piece *F1* and arm *B1* of the other inductor contacts with the opposite pole piece *F*, then the lines of force between the north and south poles *N* and *S* of the magnets pass as indicated by the line *L* through the pole piece *F1*, through the arm *A1*, through the arm *B1* and through the pole piece *F* to the south pole *S*, thus setting up current in the coil *C*. As the inductors rotate arm *A1* breaks away from pole piece *F1* and arm *B1* from pole piece *F*, and while *A1* passes over the aluminum separator *G* between the pole pieces there is no current flowing. Immediately, however, that arm *A1* comes in contact with pole piece *F* the arm *B2* has reached the pole piece *F1*, and the lines of force pass once again between the poles *N* and *S*, but from the arm *B2* to arm *A1*, thus setting up in the coil *C* a current in the opposite direction to the first impulse. In this manner as the respective arms of the star inductors contact with the pole pieces there is set up current first in one direction and then in the other. As there are three arms

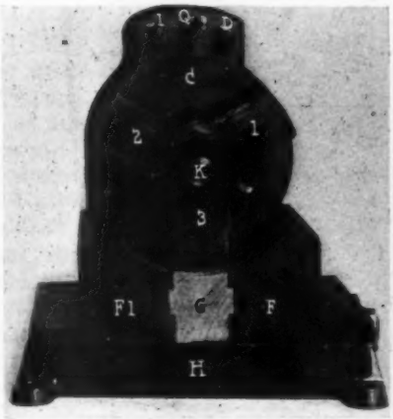


Fig. 4.—End View of Inductor and Poles.

Fig. 5.—One of the F. & S. Bearings.

to each inductor and the arms alternate, the magneto gives six pulls per revolution or, in other words, six alternations or current impulses for each complete turn of the shaft.

In wiring a car with an inductor magneto of this type and a set of dry cells, the magneto and dry cell wires go direct to the switch on the coil box, thence to the primaries of the coil and thence to the timer. The magneto cannot be used with a non-vibrating coil and distributor in that no provision is made for changing the timing by altering the relation of the inductors with reference to the magneto poles while rotating, but it affords an extremely compact and reliable source of current on a car, the inductor magneto lending itself to this purpose particularly, owing to its great simplicity, whether considered from an electrical or a mechanical point of view, which adapts it to the roughest kind of service.

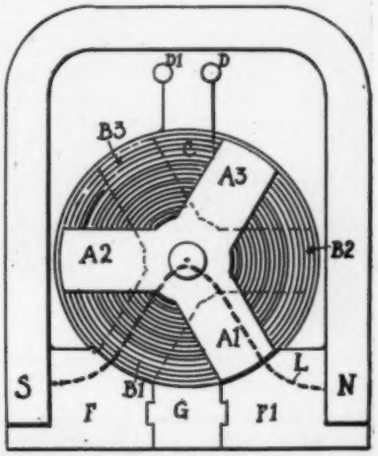
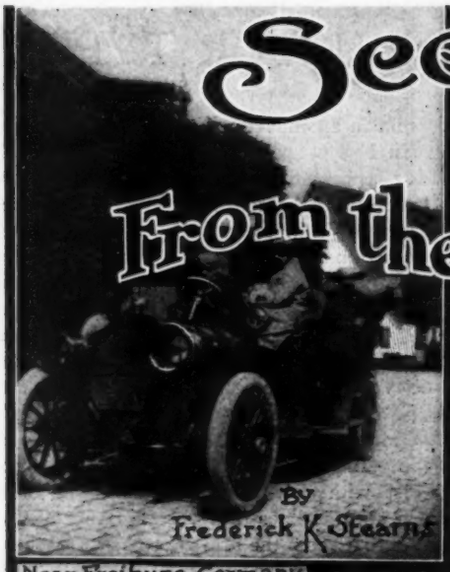


Fig. 6.—Magnetic Circuit of W. & S. Magneto.

Seeing Europe From the Rear Seat

By Frederick K. Stearns



Near Freiburg, Germany

Wayside Shrines - Tyrol

A Road in the Tyrol

IF you would see Europe properly, view it from an automobile. Also take your own car over, likewise your chauffeur. To the seasoned autoist on the Continent this suggestion may appear superfluous, but it is my advice to the novice in European travel, based on experience gained during three extended trips. True, there are drawbacks to such a plan, but they are more than offset by the advantages, particularly if one owns a good American car. The value of having your own chauffeur is most important. Of course, he is in a measure handicapped if unable to speak the language of the countries through which he drives, but even this is far better than employing an unknown native linguist as driver, however highly he may be recommended. I have had experiences in both directions, and know whereof I speak.

The car we hired in Italy, pending the arrival of my own Packard, had as chauffeur a clever fellow, but possessed of an irresistible desire to run over everything in the animal line he could reach and travel at breakneck speed through villages. Talking had no effect on him, and even more drastic measures proved unavailing.

The chauffeur who drove us around the Italian lakes was better, but he stood in with the garage that rented us the machine, and as a result we were charged fifty per cent. more than we contracted to pay.

The French driver we engaged early in the season to do the château trip had a seemingly unquenchable thirst, taking a drink whenever opportunity presented itself, and celebrating our arrival at Blois by taking our courier with him and getting gloriously drunk.

Nor were our troubles with the chauffeurs alone, but also with the people from whom we rented the cars. With a single exception, out of the half-dozen I contracted with each attempted to deal unfairly.

The first arrangement we made was a certain sum for the car, everything to be furnished. The trouble with this was that if we wanted to go a few miles out of our way to visit a certain point the chauffeur claimed it was not in the agreement and declined to go unless tipped liberally.

The next bargain made was at so much a day for the car and so much a mile for the distance traveled. This acted exactly the opposite to the first, for the driver would keep going all day, and far into the night if we had permitted him, and took us to places we did not care for, simply to make the distance greater and his bill higher.

Another arrangement we made was to pay so much a day for the car, we to pay for the gasoline, oil, keep of chauffeur, etc. This was the most satisfactory of all, but it was difficult to keep track of the supplies used, and we had to take it for granted that the bill rendered was right.

Take Your Own American Car.

Therefore, for the one who wants the full enjoyment of a European trip extending over several months, I should advise taking your own car, if you have a good one, and your own chauffeur. For, after all, the pleasure of motoring depends more than anything else upon the man who drives, and a good, intelligent American chauffeur who does not drink is a treasure without price. You cannot value him too highly when abroad.

With this detail disposed of, Europe, with its wonderful roads and its countless points of interest, furnishes a rich field for the tourist. True, much of it has been done to death, but there are still spots off the beaten path.

One of these is the Austrian Tyrol, a district where motorists have not been seen until within recent years, owing to the fact that it is not as well known for touring as Switzerland, and the difficulty of getting in on account of the high duty exacted.

Join the Touring Club of France.

If you are traveling through Europe in an automobile you should belong to the Touring Club of France. This gives the advantage of depositing the duty money on your car for each country you may desire to visit in Paris, a *triptych* being issued therefor and the money refunded on your return. This enables one to avoid all trouble at the customs in passing from one country to another. Austria, however, was the one country which refused to cooperate with the French club, and not until the middle of this year did she come into the fold. My *triptych* for Austria was about the fourth one issued

and our car was the very first to take advantage of the new working arrangement.

In driving from Munich to Innsbruck, when we presented our papers to the Austrian official at the frontier, he at first refused to accept them, insisting that we must make the customary deposit, amounting to nearly $500, before we could enter Austria. The French gentleman who traveled with us explained in his very best German that an arrangement had been entered into between the government and the Touring Club of France, and that if the official would look over his papers he might find a notification. This he finally consented to do, and much to his own surprise found our statement to be true. With an Austrian number attached to the car, we had it kodaked as the first of any make to go into the Tyrol under the new arrangement, and proceeded on our way.

The ride from Kupstein to Innsbruck is very beautiful, but it is nothing compared with that which awaits you in the heart of the Tyrol Mountains. We left Innsbruck the morning following our arrival, and made Brenner pass, which is easy of ascent, being only about 6,000 feet high. We made it on high speed, owing to good roads and the absence at that hour in the morning of other vehicles, but noticed that some of the best French cars, as well as others, went up on slow speed.

Lunching at Bozen, we obtained our first and only view of the magnificent Dolomites. Had we had more time at our disposal we would have gone further south, even into Italy, so as to visit these mountains and the beautiful district in which they lie. However, we went on to Meran, where we stopped for the night. The trip from Innsbruck to Meran is one of the finest in all Europe, and was excelled in beauty only by our next day's run to Bregenz. We ran within a few miles of the Stelvio pass, which is the highest roadway in Europe, but as we were not going that way did not take it. Another pass we encountered between Landeck and Feldkirch, while not so high as the Stelvio, was considered very dangerous by travelers, because of the excessively sharp hairpin and corkscrew curves on approaching and descending the mountains. The working of our brakes left nothing to be desired, however, and we got through safely, bringing our short but highly interesting trip through the Tyrol to an end.

Tyrol Trip Has No Equal.

To anyone who appreciates fine scenery and enjoys traveling through mountains the Tyrol trip has no equal. If more magnificent scenery exists anywhere, I have never encountered it. The towering, snow-capped mountains, the rock-ballasted roads, as a rule kept in excellent condition, the queer roadside shrines encountered at frequent intervals, the constantly changing panorama, leaves nothing to be desired unless it might be that more time could be spent here, and sends the traveler away with pleasant memories. In addition to the attractiveness of nature, the picturesqueness of the villages and the quaintness of the people in the Tyrol rounds out a picture of exceptional interest and one which the average traveler misses.

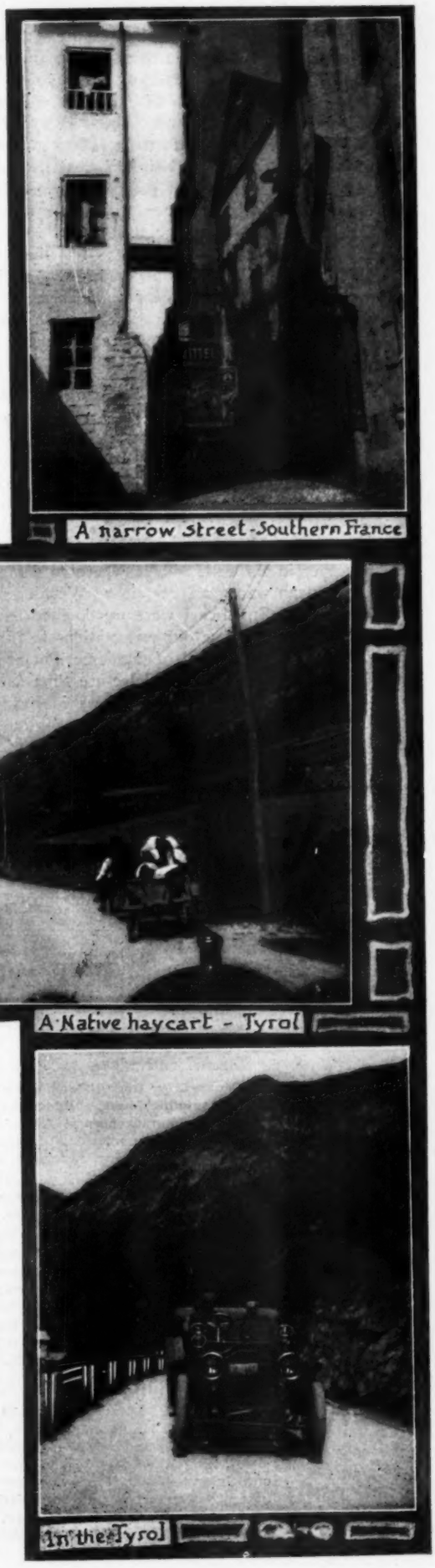
From Bregenz we drove to Freiburg, Germany, along the shores of Lake Constance and through the Black Forest. The roads are perfect and the scenery fine, alternating between views of the lake and those of the tree covered mountains. After a couple of days spent in motoring over the wonderful hills and through the vast forests around Freiburg we crossed into France by way of the Alberger pass, the border line being located on the mountain. This pass, although not so well known, is much more difficult than either of those we made in the Tyrol, yet we had no difficulty in ascending on our high speed and only had to shift in coming down the mountain, where we were in close quarters with a diligence.

Our next day's run was to Nancy, where we spent the night, and then direct to Paris, about two hundred miles, on the following day. This finished our second tour of the Summer, which in length was somewhat shorter than our first, although it embraced 2,000 miles. Add to these two trips 1,000 miles in England and our trips around Naples and Italy, along the Riviera and about the Italian lakes and it would make in round figures 6,000 miles. At no time did we try to make exceptional speed, journeying leisurely in an endeavor to see the towns as well as the country. We succeeded, too.

For three months prior to taking the Tyrol trip we motored through Europe, starting from Liverpool and doing much of England, which, although intensely interesting, is too well known to Americans who have motored abroad or, in fact, traveled in other ways to call for extended mention. A couple of days in London at the close of the English tour was sufficient to again give us the motor fever, and we drove to Folkestone, crossed the channel to Boulogne, and started at once for Paris.

Along the Seacoast of France.

After a week or so there, during which time we used our motor constantly, we started for an extended trip around the seacoast of France. At Trouville, one of the most popular seashore places in France, we were the only guests at the im-



mense Noire Roches. Nevertheless, we were entertained as graciously as if we had been a royal family and the hotel had been "full up," as they put it abroad, instead of empty.

All of which is characteristic of this country, where good living is counted the chief aim of existence, and where it is a joy to travel. Nowhere in France have I ever found anything but good food and clean beds. In the smallest country village, where apparently there was not a visitor a day at the inn, there would always be prepared the most palatable *dejeuner* on the shortest possible notice, and there were always clean rooms for travelers.

As for Spain—but that is another story.

One incident worthy of mention reflects the sentiment of your Frenchman, be he of high or low rank. At one little place where we stopped for luncheon the *chef* was owner, manager, cook, and grand factotum. He spoke a little English, and informed me that he spent two years in America as *chef* for a well-known Washington family.

What the Chef Said of America.

"America is one gran' country," said mine host, shrugging his shoulders, "but ze people, ah! Zey are w'at you call ze nice people, but zey are not artistic. Zey know not ze value of ze fine cooking, only eat, eat, eat. Cooking is ze fine art, like music an' ze drama, but ze American he does not t'ink so. So I save up my money an' come back here, where fine cooking is appreciated. M'sieur, America is ze gran' country, but I had sooner be ze inn keeper in zis leetle village where ze people know how to eat properly zan wan gran' *chef* in ze Washington."

Only at Mont St. Michel were we doomed to disappointment, and that possibly because our expectations had been pitched too high. The *omelette souffle* of Madame Poulard is more celebrated through Burton Holmes' lecture than in reality. Better omelettes are made at plenty of places in France and even at home than the present Poulard family turns out. Nevertheless, this interesting spot, now an island, except for the artificial roadway built to it, is well worth a visit.

The hotel here, like the one at Amalfi, Italy, is built away up in the air on rocks, and the climb to get to your bedroom is all the exercise one needs for an entire day. The view, however, is well worth the effort. It is here that the tide comes in faster than a horse can trot, but our guide, seeing we were motorists, tried to flatter us by saying that an automobile could probably beat the tide. We decided not to do any investigating along this line.

The entire trip along the French coast through Brittany, with its quaint villages and quainter natives, and over into Spain, is a journey never to be forgotten, as is the ride through the chateau country of France. The latter part of this trip is through a district where for miles the roadway goes by caves and cellars in the rocks in which wine is stored.

In the Heart of the Champagne Country.

Equally interesting, even to the total abstainer, is a journey through the country around Reims, in the heart of the champagne country, and where many of the most noted manufacturers of this wine have their cellars. We visited those of Pommery, which are reached by a flight of 200 or more steps down into the earth and a walk through tunnels and caves of chalk. We apparently walked a half mile, getting enough of it in this time, but our guide assured us that there were many miles of cellars, taking the upper and lower stories, and that millions of bottles of champagne were stored there.

Volumes could be written on our experiences in France, in Germany, in Austria, in Spain, in the Tyrol, in Italy and in England, but space and time forbid.

When you remember that France alone has 40,000 miles of roads whose equal is seldom encountered in America, and that conditions in the other countries enumerated are much the same, it is not difficult to understand why people who want to motor go as far as Europe.

Touring there is taken much as a matter of course. At Liverpool we met a man just starting out on a drive to Madrid with as much unconcern as though he were simply going from Detroit to Buffalo.

At Jaffa we saw Charles J. Glidden, of Boston, who has motored around the world and was finishing up a 60,000-mile trip, his being the first automobile that ever entered the Holy Land.

One meets all sorts of enthusiastic motorists who eat, drink, and sleep in their cars. To such my little experience will, of course, be of no benefit. But, be he seasoned motorist or amateur, a tour of Europe is bound to possess educational value, not the least as showing Americans the possibilities at home in the way of good roads.

THE AUTOMOBILE CALENDAR

AMERICAN.

Shows and Meetings.

Dec. 31-Jan. 7..—New York City, Grand Central Palace, Ninth Annual Automobile Show, conducted by the American Motor Car Manufacturers' Association, with Exhibits by the Importers' Automobile Salon, Inc., Alfred Reeves, General Manager, 29 West 42d St.

Jan. 16-23.....—New York City, Madison Square Garden, Ninth Annual National Show of the Association of Licensed Automobile Manufacturers. M. L. Downs, Secretary, 7 West 42d St., New York City.

Feb. 6-13.....—Chicago Coliseum and First Regiment Armory, Eighth Annual National Exhibition, National Association of Automobile Manufacturers. S. A. Miles, Manager, 7 East 42d St., New York.

Mar. 7-13.....—Buffalo, Second Annual Power Boat and Sportsman's Show, Convention Hall, Dai H. Lewis, manager, 760 Main Street, Buffalo, N. Y.

Races, Hill-Climbs, Etc.

Oct. 10.....—Providence, R. I., Narragansett Park, Race Meet, Rhode Island, Automobile Club.

Oct. 10.....—Philadelphia, Founders' Week Stock Chassis Race, 195 Miles, Quaker City Motor Club.

Oct. 10.....—Long Island Motor Parkway Sweepstakes, Conducted by Vanderbilt Cup Commission.

Oct. 10.....—Providence, Narragansett Park, Race Meet, Rhode Island Automobile Club.

Oct. 10.....—Morristown, Madison, Chatham, N. J., Automobile Carnival and "Tour Around the World," under Y. M. C. A. auspices.

Oct. 24.....—Vanderbilt Cup Race, Long Island Course, auspices of Vanderbilt Cup Commission.

Oct. 31.....—Philadelphia, Sixth Annual Run of Automobile Club of Philadelphia for the Brazier Cup.

Nov. 26.....—Savannah, Ga., Grand Prize Race, Savannah Automobile Club.

FOREIGN.

Shows.

Oct. 11-18.....—Paris, International Congress and Public Exhibition on Roads and Road Making for Modern Locomotion, French Ministry of Public Works.

Nov. 13-21 .....—London, Olympia, Seventh International Motor Exhibition.

Nov. 28-Dec. 13.—Paris, Eleventh Annual Salon de l'Automobile, Grand Palais, Automobile Club of France (Pleasure Vehicles, etc.)

Dec. 20-28.....—London, Stanley Show, Agricultural Hall.

Dec. 22-29.....—Paris, Eleventh Annual Salon de l'Automobile. (Commercial Vehicles, etc.)

Jan. 16-25.....—Brussels, Show Organized by Belgian Chamber Syndicate, Palais du Cinquantenaire.

Races, Hill-Climbs, Etc.

Oct. 11.....—Berlin, Germany, Gordon Bennett Balloon Race, Aeronautical Club of Berlin.

FIFTEEN OUT OF TWENTY HOOSIERS HAVE PERFECT SCORES

INDIANAPOLIS, Ind., Oct. 3.—The two days' reliability run given by the Indianapolis Automobile Trade Association, Thursday and Friday, developed into one of the worst gruelling contests automobiles have ever had over Indiana roads. Despite this fact, fifteen of the twenty-six cars entered finished perfect.

It had been predicted that not more than 20 per cent. of the cars entered would finish with perfect scores, and this probably had a tendency to keep down the number of entries. The roads were ideal for the kind of contest it was, offering long stretches of good highways where great speed was possible, the highest hills in Indiana to test the hill-climbing abilities of the cars, and sharp turns and dangerous stretches of roads to try the nerve of drivers and to call for most cautious handling of the cars.

The cars were turned over to the technical committee Wednesday afternoon and were parked on the west side of University Park for the night after, having been inspected and sealed. The first car left Indianapolis at 7 A. M. Thursday, and the others followed at one minute intervals.

The run Thursday was to French Lick, a distance of 131.2 miles and the roads were much better than on the return trip, which was 122.2 miles in length.

Practically all of the penalties were for things of minor importance, only one or two of the difficulties were anything that would interfere with the actual running of the car. Loose parts, lost bolts, etc., were responsible for many of the penalties. The following is the table of the run, including nature of penalties:

No.	MAKE	Driver	Class	H.P.	Price	Seals Broken	Penalizations	Final Score
1	NATIONAL	John Aitken	A	50	$4,200	None	None	Perfect
2	NATIONAL	Thos. Kincaid	A	50	3,700	None	None	Perfect
6	MARMON	H. G. Shafer	A	50	3,750	None	None	Perfect
7	MARMON	H. Stilman	A	50	3,750	None	None	Perfect
10	PREMIER	Harry Hammond	W	30	2,600	None	None	Perfect
11	PREMIER	Henry Letsinger	A	30	2,600	None	None	Perfect
12	PREMIER	Miss Elizabeth Love	A	30	2,700	None	None	Perfect
14	PREMIER	Frank Morrison	A	30	2,600	None	None	Perfect
4	STUDEBAKER	F. B. Willis	A	30	3,500	None	Left rear fender loose	2 points
9	AMERICAN	Fred Tone	A	50	3,750	None	Towed to start motor	5 points
8	HAYNES	Robert Murden	A	60	3,750	None	Foot brakes not working	10 points
5	PACKARD	Chas. Stuttz	A	30	4,200	None	Towed to start motor; starting crank bent	11 points
3	NATIONAL	Harry Moore	A	50	3,700	None	Two plates on front spring broken	16 points
18	RAMBLER	Ted Collier	B	32	2,250	None	None	Perfect
19	MITCHELL	Geo. Gastemeau	B	20	1,250	None	None	Perfect
20	MAXWELL	J. A. Newby	B	24	1,750	None	None	Perfect
21	MAXWELL	T. L. Marshall	B	20	1,450	None	None	Perfect
23	CHALMERS	J. H. Stickney	B	30	1,500	None	None	Perfect
24	OAKLAND	Harry Hocker	B	20	1,250	None	None	Perfect
26	CARTERCAR	C. J. Haines	B	20	1,350	None	Nut lost off front spring shackle bolt	5 points
25	PREMIER	Katrina Fertig	B	24	2,250	2	Adjusted coil and carbureter	11 points
17	OVERLAND	Henry Barnes	B	30	1,500	None	Foot brakes not working; towed to start motor	15 points
30	REO	O. G. Myers	C	20	1,000	None	None	Perfect
27	RAPID	Frank Grogan	C	24	2,100	None	Two loose lamps	4 points
29	HASSLER	R. H. Hassler	C	12	650	None	Towed to start motor	5 points
28	MAXWELL	O. J. Gronendyke	C	12	850	None	Reverse not working; carbureter adjusted. Broken secondary wire	19 points

SINGLE-CYLINDER SIZAIRE WINS COUPE DES VOITURETTES

PARIS, Oct. 1.—That it is not necessary to have cars of 120-horsepower to provide a good auto race is proved by the results of the Coupe des Voiturettes, run off last Sunday, over a distance of 248 1-2 miles, near Compiegne. Naudin, on a one-lunger Sizaire-Naudin limited to 100-millimeters (3.9 inches) bore, covered the distance in 5:14:8, being an average of 47 1-2 miles an hour. Although it is not such fast going as was witnessed at the Dieppe voiturette race, the performance is more remarkable, for the Compiegne circuit necessitated at least 200 changes of gear or important reductions of speed for each of its

Of the 17 cars to finish, the first six were driven by single-cylinder engines of 3.9 inches bore. Martini, the only foreign firm in the race, finished seventh, eighth and tenth with four-cylindered cars of 2.5 millimeters bore. At Dieppe the maximum bore for this type of engine was 2.4 inches; even with the extra allowance, however, it was manifest that there was a decided inferiority in power produced by the multiple compared with the single cylinder engines. Martini, however, had the satisfaction of being awarded the special prize for the best performance by cars most nearly approaching commercial models, and of being the only firm besides Sizaire-Naudin to finish with a full team.

Not even the Sizaire-Naudin engineers would maintain that the winning trio corresponded with commercial models. Bore having been limited to 3.9 inches, most firms were content to adopt a stroke of 7 inches; two firms went as high as 7.8 inches, but Sizaire-Naudin took the bold step of lengthening the stroke to 250 millimeters, which to give the exact English equivalent is 9.84 inches. It is the greatest ratio of stroke to bore ever adopted on an automobile, and was, in the opinion of the experts, ridiculously exaggerated; results, however, proved conclusively that the Sizaire-Naudin people were right. To show that the long-stroke motor is the most advantageous, it is only necessary to mention that the order in which the cars finished was in direct ratio to the length of their stroke. Sizaire-Naudin finished first with 9.8 inches stroke, Lion-Peugeot was second with 7.8 inches, Corre and La Joyeuse followed, each with 6.2 inches stroke, and Alcyon was behind with 5.9 inches.

Tire troubles were light, the first six being shod by Michelin. Bosch supplied the high-tension magnetos of the first four cars. No car made use of storage batteries for the supply of electric current. The following is the order in which the 17 out of 31 starters finished the race:

Car.	Driver.	Time.
Sizaire—Naudin,	Naudin	5:14:8
Average 47 1-2 miles an hour. Michelin tires, Bosch magneto.		
Sizaire—Naudin,	Sizaire	5:21:20
Lion—Peugeot,	Goux	5:43:50
Sizaire—Naudin,	Lebouc	5:43:53
Corre,	Collomb	5:47:29
La Joyeuse,	Taine	6:14:49
Martini,	Sonvico	6:19:29
Martini,	Beck	6:19:43
Guillemin Le Gui,	D'Avaray	6:35:13
Martini,	Richard	6:36:16
Guillemin Le Gui,	Riviere	6:39:48
Lion—Peugeot,	Bollilot	6:40:39
Alcyon,	Roisan	6:54:48
Werner,	Gassier	6:57:22
Aries,	Meau St. Marc	7:03:16
La Joyeuse,	Schweitzer	7:03:41
Truffault,	Giraud	7:33:02
Regularity Prize for team work.		
		Total Time 3 Cars.
Sizaire—Naudin		16:19:21
Martini		19:15:28

THE AUTOMOBILE

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" " in 1907 - - - - - - - - - - - - - - 888,900

SHAFT-DRIVE NOW UNIVERSAL.

With the advent of the 1909 show season, it is safe to say that a review of the models for the coming season will reveal the fact that there are now very few American makers devoting their energies exclusively to the production of a side-chain driven type of car. The transition from chain to shaft drive has been more or less gradual, but that the process is now practically complete is evident from the capitulation of those designers who have consistently adhered to the chains up to the very last. Nor is their surrender to be regarded as evidence of their conviction that the shaft-driven car is superior; it is but another instance of the fact that the public demand is far stronger than the dictates of technical requirements, or the designer's preference. If buyers will have a shaft-driven car, there can be no alternative than to meet the demand.

In some cases it is noticeable that makers of high-powered cars have abandoned the chain-drive entirely, while in others only the lighter cars turned out are of the shaft type and the chains are still retained on the more powerful models. There is at least one instancce in which the maker has frankly stated that his preference for the chain-driven car is as strong as ever, his bow to the inevitable taking the form of an option to the purchaser on either type. While the shaft drive has not only proven practical from the first, as well as highly desirable from every point of view, the preference for chains on cars above a certain weight and power is very well founded, and it seems doubtful if the chain-driven car will ever disappear entirely. It is quite probable, however, that the shaft will, sooner or later, displace the single chain now employed on some light cars, so that everything below a certain power will be of the now practically universal type.

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CONTESTS WHICH TELL SOMETHING.

In the Coupe des Voiturettes, held in France, a single-cylinder car averaged nearly 50 miles an hour over a course only fairly good. In the so-called "Four-Inch" race of the British club, held over twisting narrow roads on the Isle of Man, the cars averaged fully as well, though several of them were capable of eighty to ninety miles an hour over a real racing course.

Once upon a time—and not very long ago—a "juggernaut" which could travel in and around a mile-a-minute was rated in the top flight of speed. Now a single cylinder can do almost as well. Truly there has been a wonderful advance in the engines of automobiles, and the end is not yet.

Speed competition of the present, to have a practical value, unquestionably tends to contests for limited engines constructed for cars which are suitable for the average buyer, who demands reasonable speed at a reasonable cost. The fastest flight of which an automobile is capable may be seen in the forthcoming Vanderbilt Cup race, with abnormal engines possessing power in excess and which no sane driver will utilize to its full capacity. Having gone far beyond the limits of sanity, it is high time that the hazards of competition be modified to a degree which will bring the sport back to the realms of reason and at the same time make it of value to the purchasers of automobiles. It is probable that the 1908 Vanderbilt race will be the last of its kind, and here's hoping that no catastrophies will mar what should be the most spectacular automobile racing ever supplied.

* * *

SPORT WHICH SADLY BELIES THE NAME.

In the early days of automobiling, when horsepower was both moderate and uncertain, the circular tracks built for horse racing answered fairly well for motor racing. Then, the danger was not excessive. Now, the risk is abnormal. Of slight, if any, worth to the maker or the user, and with faults which outweigh any advantages claimed by its most ardent supporter, the finish of high speed automobile racing on horse tracks is near at hand. A perusal of the accident chapter of the Brighton Beach "24" tells its own story, and if the directors of the A. A. A. accepted the views of its president, William H. Hotchkiss, there would be no further sanctioned racing of this kind by the national body of the country. With the big powered cars driven anywhere near their capacity the danger is beyond the point of sanity. It is either this or just plain "hippodroming"—one is criminal, and the other is "fake" racing. Let us end it—at least in any sanctioned form.

Storm Center of Long Island Motor Parkway, Where Most Complete Arrangements Have Been Made for Contestants and Spectators.

PARKWAY SWEEPSTAKES NEXT, THEN THE VANDERBILT

SIXTEEN entries are known to have been made for the Vanderbilt Cup race. It may be that the resolution of the Racing Board as to those drivers that competed in the unsanctioned meet at Brighton Beach on September 11 and 12, particulars of which are set forth elsewhere in this issue, may reduce the present list by one or two, or perhaps, which is more probable, result in an increase should the suspended ones make their peace with the racing authorities. Pending the readjustment of the standing of the outlaw pilots, the Vanderbilt Cup commission has delayed making public the exact status of the entry list for the Long Island classic.

The nominations for the Vanderbilt race now amount to 10 American and six imported cars, the previous entries being made up of three Mercedes, two Knoxes, a Matheson, a Brasier, a Mora, a Chadwick, an Acme, a Thomas, an Isotta and a Renault.

The Vanderbilt Cup Commission offices have been removed from Manhattan to the Garden City Hotel, where Chairman Thompson will make his headquarters until after the race. Reservations for seats, boxes, and parking spaces may be obtained at the city offices of the Commission, 437 Fifth avenue.

Indications point to a big novel, and interesting struggle for the Sweepstakes, which will inaugurate racing on the Long Island Motor Parkway next Saturday. The course was so far completed that daylight practise over it began yesterday.

The cars will be started with the lowest-priced cars in the lead followed by the other classes in price order, the order of the start of the various sweepstakes being Nassau, Jericho, Garden City, Meadow Brook, and Motor Parkway. Each car will bear the initial of its own particular sweepstakes.

Hartford Club at the Vanderbilt Cup.

HARTFORD, CONN., Oct. 5.—The Automobile Club of Hartford has abandoned all hope of conducting either a hill climb or a 24-hour race this Autumn. Inasmuch as the Vanderbilt Cup race is almost due, it was deemed expedient that that event furnished enough excitement for the club members. A large delegation from the local club will visit the Cup race, and a good parking space has been secured that will accommodate about 50 cars near the grandstand. The Hartford delegation will have their own tents, and breakfast will be served on the grounds.

SUSPENDED DRIVERS GET ANOTHER CHANCE.

Action in the matter of drivers who competed in the unsanctioned meet at Brighton Beach, September 11 and 12, was taken by the A. A. A. Racing Board at a meeting held last Saturday. Previous to their participation in the races in question, all drivers were notified that their competition would mean disqualification. Since the race, however, several of the suspended drivers with mounts in prospect for the Vanderbilt and Sweepstakes have declared that they competed under a misapprehension. The Board leniently decided to take them at their word and give them a chance to start anew with a clean slate by the adoption of the following resolution:

WHEREAS, Various persons have participated in races coming within the jurisdiction of the American Automobile Association, but for which no sanctions had been granted by that association, and, whereas, it appears that from the statement of some such persons that they participated in the said races under a misapprehension; be it

RESOLVED, That in the cases of such participants as were under the misapprehension referred to, their disqualifications pursuant to the rules of the Racing Board of the American Automobile Association, be suspended to the extent of enabling them to participate in any race already sanctioned by the Racing Board, upon such persons filing a statement to the effect that they shall not hereafter participate in any manner or form in any race claimed by the association to be within its sole jurisdiction and for which no sanction has been granted by the Racing Board of the American Automobile Association.

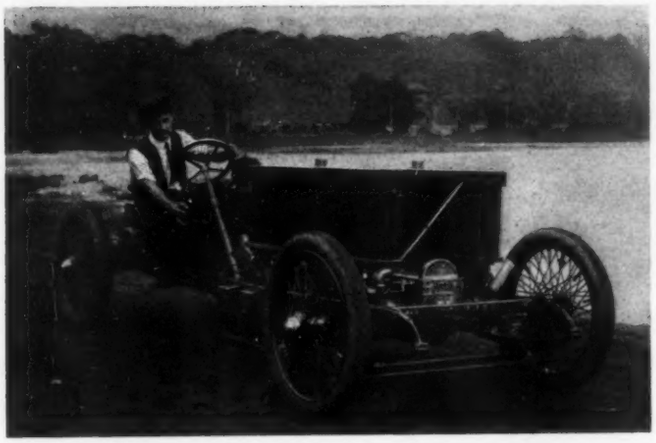
FOURNIER IS TO DRIVE AT SAVANNAH.

Quite a batch of foreign entries were received by the Automobile Club of America before the preliminary nominations closed last Thursday. Most noteworthy to Americans was the fact that Henri Fournier, who inaugurated high-speed sprinting in this country on the Coney Island Boulevard by setting up an initial world's mile record of 51 4-5 seconds, and won the Paris to Berlin race, would resume racing and return to this country to pilot one of the two Itala cars named by the Italian club. The other will be driven by Cagno.

Hautvast will pilot one Clement-Bayard, and Rigal another, while Szisz will once more be at the wheel of a Renault.

The complete list of entries to date, with another month yet to come before entries finally close, consist of the following: Fiat, Nazarro; Fiat, Wagner; Fiat, De Palma; Benz, Hemery; Benz, Hanriot; Benz, Earle; Mercedes, Salzer; Mercedes, Poege; De Dietrich, Duray; Clement-Bayard, Rigal; Clement-Bayard, Hautvast; Renault, Szisz; Itala, Fournier; Itala, Cagno; B. L. M., R. W. Buckley; American Locomotive, L. J. Bergdoll; Matheson, foreign driver; Acme, Patschske or Rodgers; Lozier, Michener.

The Savannah light car race has 14 entries to date, consisting of two Gyroscopes, three Maxwells, three De Dions, three Buicks, an American Aristocrat, a Chalmers-Detroit, and a Cameron. The latter is an air-cooled car from which great results have recently been obtained.



Maxwell 12-Cylinder 180-Horsepower Racing Car.

This powerful racing craft at Ventnor Beach, near Atlantic City, N. J., October 1, covered a mile in :31 1-5 seconds, at the rate of 116 miles an hour.

CANADIANS GREET AUTO RACING WARMLY.

MONTREAL, Sept. 28.—Canadians were given their first automobile track meet last Saturday and Sunday at Delorimier Park half-mile track. It was held under the auspices of the Automobile Club of Canada. R. M. Jaffray, promoter of the Montreal show, managed the meet for the club, though efficient assistance was rendered by President Duncan McDonald and Secretary George A. McNamee.

That Canadians are alive to the competitive possibilities of the automobile and are eager to patronize motor car racing is proved by the attendance on Sunday reaching 16,000 paid admissions.

The record trials and competition of Barney Oldfield and Charles Soules with Barney's Stearns "six" and "four," Walter Christie, and Charles Burman with the McLaughlin Buick were the chief crowd-drawing attractions. Christie showed a mile in 1:10; Soules, 1:14, and Oldfield, 1:15. Christie also made a half mile in 34 seconds. Burman made practically a clean sweep of the open stock car events, in which he was eligible to compete. The five-mile championship of Canada for 20 to 35-horsepower cars fell to L. D. Robertson's Comet, in 6:44. Robertson also beat Tedford, Stearns, in a mile match in 1:19.

DETROIT DEALERS TO PROMOTE 3 DAYS' TEST.

DETROIT, Oct. 6.—With the success of last year's event still in mind, the Detroit Automobile Dealers' Association has planned a far more difficult endurance run for next month. November 5, 6 and 7 are the dates set. The first day's run will be to Saginaw and back. The second day the course will be triangular, Adrian and Jackson being included, with Detroit as the terminus. The third day's run will be to Lansing and back.

Each night all cars will be parked in the streets near the Hotel Tuller, a strict guard being maintained. Oil and gasoline will be furnished under inspection, and at the end of the third day's run a committee will make a technical examination of each car to determine exactly what it has accomplished, each observer's report also being taken into consideration.

Entrants have been divided into three classes, the handicapping system providing for the smaller cars to start first, medium-powered ones later, and the largest ones some time after. Several valuable trophies have been offered by the Detroit Auto Dealers' Association as prizes.

CLEVELAND RELIABILITY POSTPONED.

CLEVELAND, Oct. 5.—The Cleveland Automobile Club decided to postpone its three-day reliability run, scheduled for October 7, 8, and 9, because of a conflict in dates with the contest of the Chicago Motor Club. There is a possibility that it cannot be held until the first part of November.

FRENCH MOTORDROME IN CHATEAULAND.

PARIS, Oct. 1.—France has been considering the advisability of a permanent racing course for three years, and is still considering. At the present moment the Auvergne track has fallen back a little in popular estimation, for it has been discovered that the ideal spot is in the Chateau country, by the banks of the limpid Vienne river, near Tours, and in the neighborhood of Azay-le-Rideau and Chenonceau.

The proposed course has been visited by a commission of the Automobile Club of France and pronounced to be all that can be desired. Geographically the situation is excellent, the course being in the Garden of France, in a land of good roads, and with adequate railroad facilities. After running along the banks of the Vienne, the proposed course skirts the Ruchard camp and the Chinon forest, giving a total distance of 12 to 18 miles as desired, without any railroad or cross road. The land being on a low hillside, the course would have gentle grades with absolute straightaways of four to five miles. The financial aspect of the question remains to be discussed. Local opinion is strongly in favor of the scheme.

A NEW 200-H.P. RIVAL FOR DIXIE II.

PORTCHESTER, N. Y., Oct. 5.—There is now nearing completion in the shops of the Jencick Motor Manufacturing Company here a new six-cylinder vertical 200-horsepower motor of the automobile type, which has been designed to form the power plant of the *Richard Croker, Jr.* The hull is being built by Herreshoff, at Bristol, R. I., and the boat when completed is to be pitted against the *Dixie II.* at the motor boat races to be held at Palm Beach next Winter. The motor has been designed by Stephen Jencick, and the builders are to receive a liberal bonus, over and above the contract price, for bringing its total weight down to 1,800 pounds, which, however, must be done without sacrificing strength or ability to run under full load for an extended period. One means of doing this is to be found in the employment of McAdamite for the crankcase; other features of note are the use of Hess-Bright bearings on the camshafts, and the triplex plunger pump provided to circulate the cooling water.

A NEW PITTSBURG-PHILADELPHIA RECORD.

PHILADELPHIA, Oct. 2.—George Salzman last Saturday in a Thomas light six succeeded in beating by nine minutes the previous record between Pittsburgh and Philadelphia of 14 hours 1 minute, held by S. D. Waldon, in a packard "30," carrying five passengers in all. Salzman's elapsed time was 13 hours 52 minutes. He claims, however, an actual running time of 11 hours 37 minutes, setting up 2 hours 33 minutes loss of time, due to gasoline and tire troubles, toll gates and misdirections.

The 76-mile run from Lancaster to Philadelphia was made in a dense fog. Four and a half miles were added by going to York by way of Hanover and three more by misdirection on the Littleville road, making 7 1-2 miles in excess of the Packard run of 302.4 miles, or 309.5 miles in all covered by the Thomas.

FORT GEORGE HILL CLIMB, SATURDAY OCT. 17.

The New York Automobile Trade Association has decided to hold a climb up Fort George hill Saturday, October 17. President Frank Eveland has appointed Richard Newton, Charles P. Skinner, C. H. Larson, and Walter R. Lee a contest committee to formulate the rules and conditions which will be in force. The proposal is that the classes be divided not only as to the cost, but also as to horsepower, which should bring about some close races.

BRITISH CONCERN ADOPTS KNIGHT MOTOR.

LONDON, Oct. 1.—The Silent Knight patents, which were adopted by the Daimler Motor Company, have also been arranged for by Minerva Motors, Ltd., for 1909.

DRAWING FOR SPACES IN "PALACE" SHOW.

Applicants for space in the Grand Central Palace show were scheduled to draw for their spaces to-day, the A. M. C. M. A. members in the morning, and the others in the afternoon. Space allotments for the importers have already been determined upon and made. When the applications for space closed on October 1 over 100,000 square feet had been applied for, and only 70,000 square feet are available for exhibition purposes.

At the session Tuesday the Regal Motor Car Company, of Detroit, was admitted to membership.

The question of international racing rules was referred to the contest committee with power to make recommendations.

In attendance at the meeting were: Chairman Benjamin Briscoe, Maxwell-Briscoe Motor Co.; James Couzens, Ford Motor Co.; C. G. Stoddard, Dayton Motor Car Co.; R. M. Owen, Reo Motor Car Co.; H. O. Smith, Premier Motor Mfg. Co.; Charles Lewis, Jackson Automobile Co.; S. H. Mora, Mora Motor Car Co.; W. H. Van Dervoort, Moline Automobile Co.; G. Vernor Rogers, Mitchell Motor Car Co.; and Alfred Reeves, general manager.

WILBUR WRIGHT WINS A $100,000 CONTRACT.

LE MANS, FRANCE, Oct. 6.—Wilbur Wright to-day carrying a passenger remained in flight for 1 hour 4 minutes 29 seconds, thus fulfilling all conditions of the contract signed by him and Lazare Weiller, representing a syndicate, which agreed to pay Mr. Wright $100,000 in return for patent rights in France and the colonies. The condition required two flights within a week with a passenger, for at least a distance of 50 kilometers.

Record Balloon Ascension Lasting 37 Hours.

PARIS, Oct. 6.—The 1908 Grand Prix race, organized by the Aero Club of France, to-day was won by Georges Blanched, who, in the balloon *Centaure*, completed an ascension lasting 37 hours, thus winning a cash prize of 1,500 francs and various medals and objects of art. He traveled exactly 550 kilometers, and landed near Allois.

TO TEST NEW JERSEY'S AUTOMOBILE LAW.

PATERSON, N. J., Oct. 5.—Frederick J. Kane, of Woodhaven, L. I., driving a Packard automobile which did not carry a New Jersey registration number, this afternoon, was arrested for a violation of the present Frelinghuysen law. The case is the test case planned by the Associated Automobile Clubs of New Jersey, and when arraigned before Recorder Carroll, Mr. Kane was represented by former Attorney-General John W. Griggs. The hearing was set for October 19, after which the case will be taken to a higher court. Under the present law, though an owner may be registered in his home State, he is also required to do likewise when he enters New Jersey.

AUTO MAKERS INVADE CARRIAGE EXPOSITION.

This week the annual exposition of the Carriage Makers' Association has been in progress in the Grand Central Palace, New York City, and one of the first things noticed by visitors is the fact that no less than fourteen different makes of automobiles are on exhibition. The following cars are exhibited: Rambler, Ford, Autocar, Gyroscope, Marmon, Glide, and Brush; and the Holsman, Anderson, Economy, Reliable, Dayton, Schacht, Kiblinger, and Mallon buggyabouts.

WHITE MOUNTAINS TOURISTS INCREASING.

BRETTON, N. H., Oct. 5.—The great and growing popularity of the White Mountain region as a touring district is evidenced by the number of cars registering at the Bretton Woods garage. In 1907 there were registered 800 cars. This year the increase has been nearly 50 per cent., for the number rose to 1,137 for the present season. With the low estimate of four passengers per car, it means that at least 3,200 people toured to Bretton Woods in 1907 and 4,548 in 1908.

NORTHERN MERGED INTO E-M-F COMPANY.

DETROIT, Oct. 5.—During the past few month much gossip has been in circulation concerning the proposed disposal of the Northern Motor Car Company. The reports have been very conflicting, but it is now announced directly from the Everitt-Metzger-Flanders Company that it has taken over the Northern concern in its entirety; the two factories at Detroit and Port Huron and the cars now on hand—about 100 of the two-cylinder models. The capital stock of the Everitt-Metzger-Flanders Company has been doubled, so that it is in the million-dollar class.

Walter B. Flanders, general manager of the E-M-F Company, states the the acquisition of the Northern will in no way change the plans of his concern. "Except we'll be able to increase our output and inaugurate a plan I have long wanted to put in force. That is, a separate factory for the production of replacement parts for all previous models of Wayne and Northern cars, as well as for all future E-M-F models."

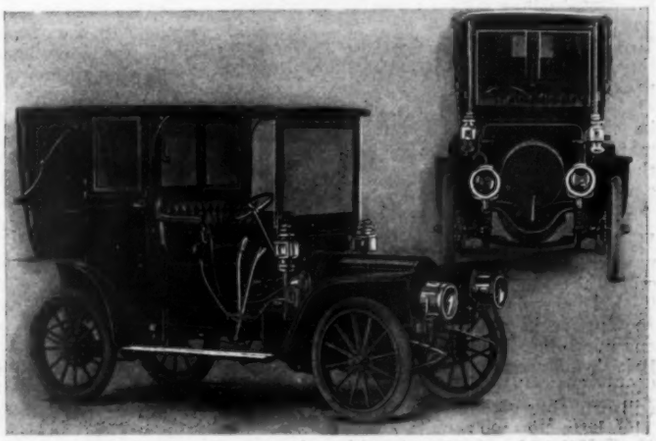
DYNAMO RUSHMORE IS ON THE WARPATH.

PLAINFIELD, N. J., Oct. 5.—Samuel W. Rushmore, he of dynamo fame, has all Plainfield by the ears through his novel and aggressive campaign against what he claims to be his outrageous tax assessments. He has raised above his factory a conspicuous illuminated sign depicting a ring politician with hat cocked on one side, cigar atilt, and monster diamond pin. The sign bears the legend: "Tremendous Taxes for easy Plainfielders. Easy taxes for men in the ring. Rushmore tax books for 'Who's Who, and Why.'"

For the past three weeks Mr. Rushmore has had five men copy the Plainfield tax registers for his "Who's Who, and Why."

FRANKLIN TO SPECIALIZE ON CLOSED CARS.

Up to the beginning of the present year, the builders of the Franklin air-cooled cars have devoted little or no attention to the construction of closed bodies for their cars, although for several years past they have maintained a complete body-building shop as a part of their automobile plant. For the coming season, however, they have decided to bring out five closed models, one of which will be an inside-driven brougham for two passengers, on the 18-horsepower, four-cylinder chassis, to list at $2,250, and a six-passenger special town car, to be known as Model K-2, which will have as its foundation the special Franklin cab chassis. This is also equipped with an 18-horsepower motor, designed for the hardest kind of town and suburban service. The other two models are both of the landaulet type, one, a four-passenger 18-horsepower car, probably being the smallest of its kind on the market; it lists at $2,500, while the larger car of the same type is equipped with a 28-horsepower motor and lists at $4,000. The limousine will be the largest closed car of the Franklin line and will be built on the six-cylinder, 42-h.p. motor.



Side and Front Views of 1909 Franklin Model D Landaulet.

News In General

Two of the Motor Parkway Sweepstakes Performers.

The first to establish headquarters for the Sweepstake events which are to take place this Saturday at the opening of the Long Island Motor Parkway, was the Dayton Motor Car Company, which secured quarters at the estate of Albert Gifford, at Westbury. The camp is in charge of Joseph Tracy.

Will Outlast a Locomotive.—"Given no more than the ordinary care by the average owner a Pierce Arrow will outlast any locomotive in use to-day," says J. L. Osgood, a consulting mechanical engineer of Buffalo. Continuing, he said: "I know the Pierce cars thoroughly, and I have had more or less to do with them since the first ones were manufactured, and in saying this I do not make any qualifications of any kind. Locomotives are, of course, subjected to strains, but these are more than offset by the road strains automobiles are called on to withstand in ordinary usage. For instance, one of the strains that tells most on a locomotive is encountered when it rounds a curve at high speed. Even then, however, it has the advantage of a banked track. The automobile encounters sharper curves and has to negotiate them on an almost level roadway. Again, the locomotive is in the hands of a trained mechanic, while the automobile is often driven and cared for by a man who has only a superficial knowledge of machinery and its needs. Yet, with all the advantages of care a locomotive has over an automobile, the latter will outlast the former, and I have no hesitancy in saying that a Pierce Arrow should give good service for fifteen years."

"Rapid" Trucks in Demand.—The reports from Pontiac, Mich., the home of the Rapid Motor Vehicle Company, makers of commercial vehicles, shows that this company is making great preparations to handle its business for 1909. Besides the new additions that are just being completed, the company is starting work on an office building to take care of the increased business in that part of the organization, and H. G. Hamilton, the general manager, says that if the orders continue to come at the present rate they will soon have to start on another factory. W. A. Sommerville has been added to the staff as advertising manager, and T. P. Myers, formerly of the advertising department, has been made general sales manager.

Herreshoff Motor Company.—The Herreshoff Motor Company is the title of a new concern just established in Detroit to undertake the manufacture of automobiles. C. F. Herreshoff, one of the sons of the famous yacht designer, and until recently engineer in charge of the American & British Manufacturing Co., Bridgeport, Conn., is the head of the new company and will probably give his name to the product. The latter is to consist of three cars, a 22, 25 and 40-horsepower machine, the power plants of which will probably be built in Bridgeport. The new cars will doubtless be revealed in the East for the first time at the coming show of the A. M. C. M. A., in the Grand Central Palace in January.

Motorcycle Makers Organize.—The importance of the motorcycle has increased until there are at present more than twenty manufacturers of two-wheelers in this country. The makers now come out with the announcement that they have gotten together and organized under the name of the Motorcycle Manufacturers' Association, with everything pointing to the election of George M. Hendee, of Springfield, Mass., as president. The new association appointed a show committee at its first meeting and plans are already under way for a complete exhibit of motorcycles at the Madison Square Garden show in January, with the Chicago and Boston shows to follow.

Rambler Makes Long Run.—A Rambler Model 34-A, driven by "Sandy" Dunlop, of Salt Lake City, arrived in Chicago last week, having made the 2,018-mile trip over the difficult roads in ten days without any serious trouble. The car is owned by J. A. Pollack, of Salt Lake City, and they are now on the return trip, going by way of St. Louis and the Southern route. On the trip eastward they averaged better than 190 miles a day, which is rather exceptional, especially through Wyoming, where the roads were in bad shape from the recent rains.

A New "Show Me" Country.—According to Sales Manager Churchill of the Winton Company, the original "show me" country is on the Pacific Coast, and not Missouri, at least as far as the automobile trade is concerned. Mr. Churchill is now on his annual trip to the Coast, and finds trade there large and growing fast; that the Winton Sixes have taken to the hard work along the coast in fine shape and feels perfectly satisfied that his company is getting its full share of Western buyers.

New Licenses in Ohio.—The new automobile license law of Ohio has now been in effect for over three months and Registrar F. H. Caley reports that he has collected $51,470.10, of which $33,470.10 goes to the State for general revenue fund and $18,000 is retained to pay the expenses of the administration until January. Licenses have been furnished to 9,639 owners, 1,549 chauffeurs, and 146 manufacturers and dealers. This seems to indicate that over 8,200 owners drive their own machines.

New Facilities for the Speedwell Company.—The shipping department of the Speedwell Motor Car Company has always had trouble because of the lack of railroad conveniences near the factory, but this is now being remedied by a spur track which is under construction from the New York Central tracks. Along with the other many improvements which the company is making they will soon have one of the best equipped factories in Dayton.

Loziers Used "Hess-Brights."—It is worthy of note that not only did both the Loziers, in the September meeting at Brighton, use Hess-Bright ball bearings throughout, from crankshaft and camshaft to gearbox and both axles, but out of the five cars making the best mileage four were on "Hess-Brights."

Chief Croker Orders an Acme.—Coridon & Flinn, the New York City agents for the Acme, report that Fire Chief Croker has put in his order for an Acme Sextuplet. Chief Croker has found that it has been a great help in his work to have a machine that could answer fire alarms without delay.

New Ford Plant?—It is currently reported in Philadelphia that the Ford Motor Company has bought a 400-acre tract of farm land and meadow at Cold Spring (near Cape May), N. J., upon which it will build large factories and a speedway for testing purposes.

Harris Oil at Brighton.—The winning Simplex used Harris oil in the recent 24-hour race at Brighton Beach. The problem of lubrication is an important one at any time, but doubly so for any car engaged in a speed contest.

IN AND ABOUT THE AGENCIES.

Ajax Tires, Philadelphia.—Taking advantage of its ideal location for viewing the Founders' Week parades, Manager "Joe" Keir, of the Philadelphia branch of the Ajax-Grieb Rubber Company, at 316 North Broad street, has erected a grandstand in front of the store, and has issued complimentary tickets therefor to all users of Ajax tires in Philadelphia. As this is the branch house's opening week, this novel idea of showing courtesies to visitors is a peculiarly happy one, especially in view of the fact that grandstand seats are being quoted at almost prohibitive prices.

Pierce Arrow, Philadelphia.—The new home of the Pierce Great Arrows in Philadelphia, provided by the Foss-Hughes Motor Car Co. at the corner of Broad and Race streets, has just been opened up with everything ready for the proper handling

New Store of Foss-Hughes Motor Car Company, Philadelphia.

of the 1909 trade. On the first floor ample show room has been provided with the offices of the company on the second floor.

Kissel Kar, New York.—The Apthorp Motor Car Company, of which F. S. Dickinson is the president and treasurer, has closed a contract with the Kissel Motor Car Company to handle its product in New York and vicinity. A salesroom, opened at 2230 Broadway, will be connected with the garage around the corner on West Eightieth street.

Kissel Kar, Minneapolis.—Among the interesting changes in the Minneapolis trade comes the news that Roy Maxfield has purchased the interests of the Rice Bros. in the firm of Maxfield & Rice, and will continue in the automobile trade at 1401 Hennepin avenue under the name of the Maxfield Company. The Kissel Kar and the Mason lines again will be carried.

Stearns, Pittsburg.—The property formerly owned by the Colonial Automobile Company has been bought by a new concern backed by several of Pittsurg's influential business men, with O. T. Bowman as manager. This company will handle the Stearns car and probably a line of electrics and smaller gasolene machines.

Oakland, Indianapolis.—Preparations are now under way in Indianapolis for an agency which will handle the Oakland cars exclusively. The Independent Automobile Company has been organized and rooms leased at 216 East Vermont street, where a complete line of cars will be on hand.

Stepney Spare Automobile Wheel, New York.—The American Stepney Spare Wheel Company, Eastern distributers, have removed to 1773 Broadway from 341 Fifth avenue, and in new quarters is most comfortably located.

Rambler, Boston.—Manager Charles, of the Thomas B. Jeffery & Co., Boston branch, is preparing to move from the quarters occupied by the Rambler for years on Columbus avenue, to a new and larger store at 95 Massachusetts avenue.

Pennsylvania, Newark, N. J.—The J. M. Quimby Company has just closed a contract with the Pennsylvania Auto-Motor Company, of Bryn Mawr, Pa., to act as distributer of its cars in New York, New Jersey and vicinity.

Rambler, Kansas City.—The Rambler Automobile Company of Kansas City, Mo., has been incorporated and will open up a garage at 1116 East Fifteenth street, in the building formerly occupied by the Midland Company.

Winton, Tacoma.—The Winton Motor Carriage Company has established an agency in Tacoma, Wash., with F. H. Faber, who will open up a model garage and devote his time to the Winton.

Diamond Tires, Detroit.—The Detroit branch of the Diamond Rubber Company will move October 15 to the old quarters of the Cadillac retail department, corner Jefferson and Brush streets.

Oldsmobile, Philadelphia.—The Philadelphia branch of the Olds Motor Works, at 231-233 North Broad street, has been opened, with William T. Taylor as manager.

Gaeth, Pittsburg.—The Arlington Motor Car Company, of Pittsburg, has been appointed agent for the Gaeth car for Western Pennsylvania.

PERSONAL TRADE MENTION.

E. LeRoy Pelletier, advertising manager of the E-M-F Company, will also take care of the advertising for the Studebaker Automobile Company, which it will be remembered purchased one-half of the output of the Detroit concern—6,000 cars—and assumed control of all the Western and Southern territory. This brought the two firms into such close relations that it was thought advisable to have all of the advertising in the hands of one man, so Mr. Pellitier will conduct the campaign for Studebaker commercial wagons, electrics, etc., as well as for the E-M-F.

"Governor" Fred E. Castle has resigned from the position of sales manager for Gray & Davis, and is now considering several promising propositions in which his trade experience of fifteen years, first in the cycling and then in automobiling, may be utilized to the best advantage. Mr. Castle has a wide and valuable acquaintance in all parts of the country, and his friends believe his next business affiliation will be a significant one. For the present he will continue to make his headquarters in Detroit, Mich.

Albert C. Galbraith has accepted a position with the Diamond Rubber Company, and will travel in New England from the Boston branch. He was formerly connected with the Fisk Company in its Pennsylvania, Maryland and Virginia territory.

G. C. Miller, formerly secretary for the superintendent of police of Buffalo, has been appointed sales manager of the Kane Motor Supply Company, of that city, with offices and show rooms at Ellicott and Tupper streets.

Forbes S. Dey, well known to the trade as "Teddy" Dey, and associated with the George N. Pierce Company, of Buffalo, for the past twelve years, has been appointed agent for the Pierce Arrow at Kansas City, Mo.

Charles E. Worrell, formerly with the Waverley branch of the Pope Motor Car Company, has accepted a position with the sales department of the Overland Automobile Company, of Indianapolis.

P. C. Nelson, formerly of the Electric Vehicle Company, has gone with the Newark branch of the Packard Motor Car Company, where he will be connected with the sales department.

James B. Strawbridge was elected general manager and treasurer of the Cleveland Motor Car Company at the recent meeting of the board of directors in New York City.

BOSTON TRADE CHANGES.

BOSTON, Oct. 5.—The first of the month saw a number of notable changes in the local trade. Prominent among them was the removal of the New England branch of Thomas B. Jeffery & Co., from Columbus avenue to No. 93 Massachusetts avenue, the store formerly occupied by Morrison & Price. In his new quarters Manager V. A. Charles has a commodious and well lighted salesroom with ample facilities for storage of parts and making repairs.

The old Rambler store on Columbus avenue has been taken by the Firestone Rubber & Tire Company, which formerly occupied a store in Park Square. Manager T. H. Glenn is making extensive alterations.

The New England Peerless branch has also made a change, but Manager John L. Snow is still satisfied with Columbus avenue as a location. He has taken the store next door to his old salesroom and has made a most attractive salesroom. He also retains a part of the old store for offices, renting the rest to Alonzo G. Peck, the veteran Columbia bicycle agent.

John H. MacAlman, formerly manager of the Columbia branch, now acting as agent for this car, has been deprived of a part of his quarters on Stanhope street, the garage and repair shop having been taken by the electric lighting company, which is fitting up a new garage for its own uses.

On Boylston street the Kissel Kar Company is about opening a store in the quarters formerly occupied by H. C. Stratton & Co.

J. W. Maguire & Co. has doubled the size of its salesrooms by taking down the partition between his old store and that next door, formerly the Napier headquarters.

ROYAL CO. REORGANIZED.

CLEVELAND, Oct. 6.—The Royal Motor Car Company, of this city, has been reorganized after many months of hard work upon the part of a committe of creditors working under the direction of United States Judge Taylor and F. A. Scott, of the Superior Savings & Trust Company, receiver, and in a short time will place upon the market a new model.

The first cars of a new model are now almost completed, and in a short time will be ready for the inspection of the public. The first of the new models to be turned out will be a four-cylinder 55-horsepower touring car, very similar in general appearance to the well-known model G. The Royal people have also been working upon a six-cylinder model of about the same horsepower, and have assembled such a car, it is said, but this model will not be put upon the market this fall.

The generous attitude of the majority of creditors was what made possible this reorganization. The concerns represented by these men have believed ever since the failure that the Royal would pull out of its trouble if given a little aid and help. In support of this attitude, the creditors' committee has been doing yeoman service in an effort to bring something tangible out of the chaos into which the Royal Company was plunged, and the net result is the reorganization.

VETERAN DEALER A BANKRUPT.

Charles A. Duerr & Co., agent in New York for the Royal Tourist and Moon cars, have filed an involuntary petition in bankruptcy, with liabilities of $100,000 and nominal assets of between $65,000 and $75,000. Lindsay Russell has been appointed receiver.

William B. Cooley.

President of the new Waverley Company, and successor to the Popes in the management of the Waverley electrics. The Waverley Company recently purchased the Waverley plant of the Pope Motor Car Company, and Mr. Cooley is one of Indiana's most prominent business men. Associated with him are about a dozen of the best known capitalists and business men of Indianapolis.

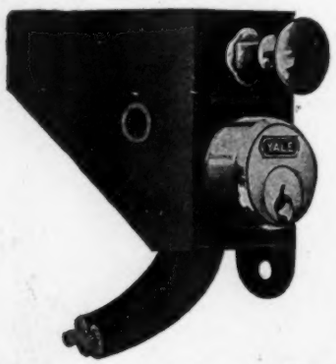
INFORMATION FOR AUTO USERS

Break Circuit Auto Lock.—As its name implies, this is a device for locking either an electric or gasoline car, operating directly in the power circuit in the former case and on the ignition in the latter. It is being manufactured and marketed by

BREAK CIRCUIT LOCK FOR GASOLINE CARS.

the Safety Device Company, 372 South Illinois street, Indianapolis Ind. When the switch bar of the lock is pulled forward it breaks and locks the circuit automatically, so that no connection can be made until one of the two keys furnished with the Yale lock is inserted and given a half turn, the switch bar then automatically springing back into place. In the case of an electric vehicle, the lock is installed beneath the upholstering on the arm of the seat so that only its face is visible. It takes the place of the ordinary cut-out or plug, and a valuable additional feature is to be found in the fact that on an electric, should it be found impossible to shut off the current to stop the car in any other manner, pulling out the switchbar of the lock will accomplish this.

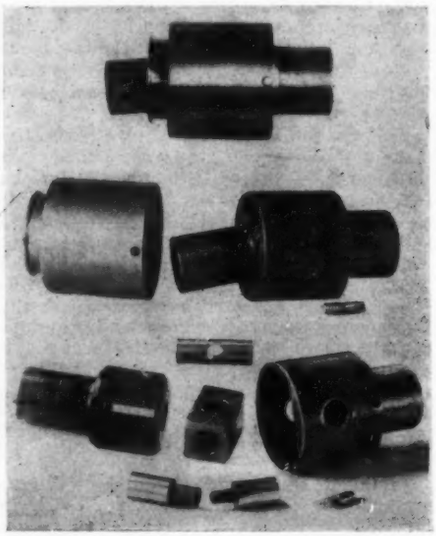
On a gasoline car it is applicable to any system of ignition, whether with single or double sets of batteries, battery



BREAK CIRCUIT LOCK FOR ELECTRICS.

and magneto, etc., and in the latter case the Break Circuit Auto Lock takes the place of both the switches otherwise necessary. The switch lever of the Auto Lock may be thrown from one set of batteries to the other, or from battery to magneto, but when pulled forward it breaks the circuit completely. The lock is installed on the face of the coil box and once in place there are no exposed binding posts or wires. All necessary fittings and wiring are supplied with the Auto Lock. The latter is furnished in brass or aluminum as desired.

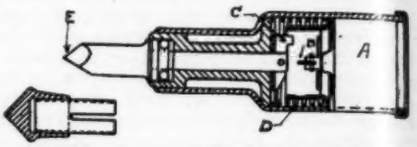
K-B Type "E" Universal Joint.—The Kinsler-Bennett Company, of Hartford, Conn., has designed and are manufacturing a new universal joint to meet the requirements of shaft-driven automobiles of the light and medium type, or for use on motor boats. It is strong and simple, being composed of but few parts. The body is a casing into which is inserted a hardened steel bushing. The sleeve, or yoke, has a rectangular opening which holds the steel block, the joint being held together by a three-quarter-inch steel pin, thus making it sufficiently strong. All working parts have been carefully hardened. To keep the joint free from dirt a steel cover, held in place by a spring plug, slips over the outside,



K-B TYPE E UNIVERSAL, DISASSEMBLED.

and besides this there is a leather boot which fastens to the cover and straps to the propeller shaft. The outside diameter of the joint all assembled is three and a quarter inches. This same concern is also introducing another similar universal for use on low-priced runabouts, known as style D.

New Veeder Speed Indicator.—The Veeder Manufacturing Company, of Hartford, Conn., has just put on the market a new speed indicator which has some new and valuable features. The counter, which occupies the space marked A in the accompany drawing, is the same that has been in use by this company for years, and will operate equally well in either direction. The feature about this new indicator which makes it of especial value is the clutch, shown at B and C, which permits the user when taking the revolutions of a rotating shaft to place the point E in position on the end of the shaft, and with his watch in the other hand, put the counter in operation by pressing in against the spring D at any time he desires. The spring D holds the two parts of the clutch separated unless the pressure of the hand brings them together. This operation is made easy by the ball bearing thrust which has been provided. No matter in which direction the shaft turns, the difference of these two readings will be the r.p.m., if the time has been one minute. The indicator is not effected by a magnetic field; this coupled with the fact



SECTION NEW VEEDER SPEED INDICATOR.

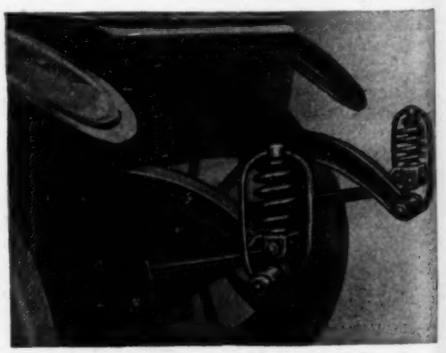
that it works equally well at high or low speeds, makes it adaptable for motor and generator use.

"Trimo" Monkey Wrench.—Under this head the Trimont Manufacturing Company of Roxbury, Mass., one of the oldest and largest manufacturers of wrenches in the United States, has brought out a wrench especially designed to meet the needs of the automobile owner. It is made up of only three parts which are all drop-forgings of special steel and case-hardened. In the accompanying cut the three parts are clearly shown; the handle, the movable jaw, and the nut. The movable jaw is slotted from the head back to the end of the screw so that it slips over the narrow

SIDE VIEW TRIMO MONKEY WRENCH.

portion of the handle and the nut screwed on as shown, with a plug and pin to keep the nut from being screwed back too far while in use. The makers are putting this new design on the market in six different sizes, from six inches up, with larger ones to follow. The same firm have also put out a pipe wrench of a similar design.

Sager Easy Spring.—The J. H. Sager Company, of Rochester, N. Y., the makers of the Sager equalizing spring, has just brought out a new design intended for use on runabouts or any car having stiff semi-elliptic springs. In the accompanying cut the coils spring is shown attached to a



SAGER EASY SPRINGS IN POSITION.

Mitchell runabout, showing how the spring holder is attached to the rigid part of the frame, which the company claims does away with any side motion that tends to take place. On account of the coils being more sensitive than the flat springs the small jars of the road are taken by them, but when the resistance of the coils equals that of the flat they will work together.